

MOUNT BAKER-SNOQUALMIE NATIONAL FOREST SPECIALIST REPORT OUTLINE ENVIRONMENTAL ASSESSMENT

S.F. Stillaguamish Vegetation Project

Wildlife

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December 7, 2016, edits thru May 2017

1. Applicable Laws, Regulations, and Policies

Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (LRMP)(USDA Forest Service 1990).

Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the range of the Northern Spotted Owl. (USDA Forest Service and USDI Bureau of Land Management 1994) (Northwest Forest Plan).

The January 2001 ROD standards and guidelines and the December 2003 species list, except for the red tree vole which remains as Category C across its range, *and/or* the four categories of projects exempt from the Survey and Manage standards and guidelines as stipulated by Judge Pechman (October 11, 2006, “Pechman exemptions”).

Endangered Species Act - Section 7(a)(2) of the Endangered Species Act of December 28, 1973, as amended requires every federal agency to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or results in the adverse modification of critical habitat. A Biological Assessment is required to facilitate consultation with the U.S Fish and Wildlife Service on any federally threatened, endangered, or proposed species determined to be affected by the proposed project.

The National Forest Management Act of 1976 – This act mandates the use of management indicator species (MIS) (Forest Service Manual 2621.1).

The Migratory Bird Treaty Act (MBTA)/Landbird Conservation Plan (Presidential Executive Order 13186, and FS/FWS MOU, Jan. 2001) - This act requires federal agencies to assess project actions that may affect avian species covered by these doctrines and their habitats. The MBTA outlines responsibilities of federal land management agencies relative to landbird conservation, and the MOU provides interim direction on implementation of the MBTA. The Forest Service will collaborate with the U.S. Fish and Wildlife Service, as needed, if project actions produce measurable impacts to avian resources.

2. Relevant Standards and Guidelines

1990 Forest Plan

Wildlife Habitat Management p. 4-124(1): Provide sufficient numbers and sizes of live and dead trees to maintain primary cavity excavators at eh 40% population level.

Wildlife Habitat Management p. 4-124(2): In addition to snags, large dead and down logs will be left.

Wildlife Habitat Management p. 4-124(3): Protect and maintain nest sites actively used by raptors and other species of concern

Wildlife Habitat Management p. 4-124(7): Maintain a mix and distribution of successional stages that will support maintaining or enhancing diversity.

Wildlife Habitat Management p. 4-124(8): Provide highest levels of deer and elk habitat capability possible while still meeting other primary resource objectives.

Wildlife Habitat Management p. 4-125(11): Activities that adversely affect mountain goats on their spring and summer range shall be identified and mitigated.

Wildlife Habitat Management p. 4-125(14): Maintain areas that serve as connecting habitat or corridors for indicator species native and desirable non-native plant and animal species and communalities.

Threatened and Endangered and Sensitive Species p. 4-127(1): All proposed management actions that have the potential to affect habitat of endangered, threatened, or sensitive species will be evaluated to determine if any of those species are present. When sensitive species are present, a Biological Evaluation shall be completed as described in Forest Service Manual 2670. Habitat for sensitive plants and animals shall be managed to ensure that management activities do not contribute to these species becoming threatened or endangered.

Threatened and Endangered and Sensitive Species p. 4-128(5): USDI Fish and Wildlife Service will be consulted for technical information and ESA Section 7 consultation when a management activity may affect a threatened or endangered species.

Management Area 15 – Mountain Goat Habitat p. 4-235(Timber E-1): Practices applied shall be for the primary purpose of maintaining mountain goat winter range.

Management Area 15 – Mountain Goat Habitat p. 4-235(Timber E-3): Any limited harvest activity should have restrictions, similar to A-4b (Restrictions on motorized use from October 31 – June 15).

1990 Forest Plan, as Amended, 1994 Record of Decision

The project area is classified as Late-Successional Reserve (LSR), Private, and Riparian Reserve under the Forest Plan as amended. The LSR designation provides for management of late successional habitat. The project area also includes the Riparian Reserve designation which overlays other land allocations and where riparian-dependent resources receive primary emphasis. The following are standards and guidelines that apply to all land allocations and apply specifically to the project.

Aquatic Conservation Strategy B-11: Objective: 8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands.

Aquatic Conservation Strategy B-11: Objective: 9. Maintain and restore habitat to support well distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

Late-Successional Reserves C-16: As a general guideline, non-silvicultural activities located inside Late-Successional Reserves that are neutral or beneficial to the creation and maintenance of late-successional habitat are allowed.

Late-Successional Reserves C-16 Road Maintenance: Road maintenance may include felling hazard trees along rights-of-way.

Late-Successional Reserves C-17 Developments: New development proposals that address public needs or provide significant public benefits such as powerlines, pipelines, reservoirs, recreation sites, or other public works projects will be reviewed on a case-by-case basis and may be approved when adverse effects can be minimized and mitigated. These will be planned to have the least possible adverse impacts on Late-Successional Reserves. Developments will be located to avoid degradation of habitat and adverse effects on identified late-successional species.

Riparian Reserves C-32 Timber Management (TM-1c): Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics need to attain Aquatic Conservation Strategy objectives.

2001 Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, ROD.

Surveys Prior to Habitat-Disturbing Activities p. 8: Surveys will be conducted at the project level prior to habitat-disturbing activities, and in accordance with Survey Protocols, to avoid loss of undiscovered sites by habitat-disturbing activities.

This report serves as the Biological Evaluation which is a 5-step process (FSM 2672.43). Each Proposed, Endangered, Threatened, Sensitive species, and other species of concern, potentially occurring in the proposed South Fork Stillaguamish Vegetation Project, was evaluated based on these steps; (evaluation of impacts on a given species may be complete at the end of step #1 or may extend through step #5). A second objective of this evaluation is to ensure these species receive full consideration in the decision-making process, to maintain species viability and meet

defined recovery goals. The Biological Evaluation process provides a description of office analysis/fieldwork done, and mitigation activities necessary to ensure proposed management actions will not likely jeopardize the continued viability of listed species by the USDI Fish and Wildlife Service, and species listed as sensitive by the USDA Forest Service Region 6 (USDA FS 2008, FSM 2670.44).

3. Other Programmatic Direction

Interagency MOU on grizzly bear habitat: In regards to the North Cascades Grizzly Bear Recovery Area, the MOU between the Forest Service and U.S. Fish and Wildlife Service stipulates that there is no net loss of core habitat (1997). The effects discussion for grizzly bear provides more detail on this.

4. Definitions of Technical Terms (if needed)

100-acre Cores (LSR) are the best 100 acres around northern spotted owl activity centers that were documented as of January 1, 1994 on Matrix and AMA lands, and are managed as LSR.

Carrying capacity: The maximum number of organisms that can be supported in a given area of habitat at a given time.

Designated Critical habitat: (Endangered Species Act) defined as an area occupied by a species listed as threatened or endangered within which are found physical or geographical features essential to the conservation of the species, or an area not currently occupied by the species, which is itself essential to the conservation of the species. As defined in the ESA “conservation” means any and all methods and procedures, and the use of those, needed to bring a species to recovery—the point at which the protections of the ESA are no longer needed.

Dispersal habitat: For northern spotted owls, habitat that meets the 50-11-40 (50 year old or greater forest stand with trees 11 inches d.b.h. or greater with a stand average 40% canopy cover) (Thomas, et al 1990). Dispersal habitat that has adequate flying space is considered a travel corridor between blocks of nesting, roosting, and foraging habitat. Dispersal habitat generally does not meet the criteria for nesting.

Early seral: An ecological age class designation. Early successional condition with open canopy generally with less than 60 percent overstory tree cover and less than 2 inches mean diameter breast height. Vegetation is typically some combination of graminoids, forbs, and shrubs, and can have tree seedlings or saplings.

Ecosystem management: A land management system that strives to maintain the natural processes and balances as well as provide for human use

Endangered species: A threatened species or distinct population segment found by the Secretary of the Interior to be threatened with extinction.

Extirpated: Eliminated from a local area.

Fragmentation: The degree to which the landscape is broken into distinct patch types.

Habitat conservation area (HCA): Part of a network of habitat proposed by the Interagency Scientific committee to protect spotted owls. A contiguous block of habitat to be managed and conserved for breeding spotted owl pairs, connectivity, and distribution of owls. Has been replaced by late successional reserves as the working management unit for protecting spotted owl habitat.

Hibernacula: Sites where hibernation occurs.

Human influence zone: Areas of human activity (recreation sites, roads, trails, buildings, mines, hydropower operations, etc.) buffered by one-fourth mile around trails and one-half mile around roads and other sites.

K-V funds: Knutson-Vandenberg Act. Federal law that allows the U.S. Forest Service to collect money from a timber sale for resource enhancement, protection, and improvement work in the timber sale vicinity.

Large woody debris: Pieces of wood larger than 10 feet long and 6 inches in diameter.

Late seral: An ecological age class designation. Late successional condition with a single or multiple canopy structure, including mature, large trees, and old-growth stands. Usually containing snags and down wood structure.

LSR (Late-Successional Reserve): mapped or unmapped areas of forest seral stages that include mature and old-growth age classes. These reserves are designed to maintain a functional, interacting late-successional and old-growth ecosystem. (ROD USDA-USDI, Standards and Guidelines 1994, B-1)

Neotropical migrants: Birds that migrate from North America to regions south of the Tropic of Cancer (latitude 23 1/2 degrees north) to winter.

Omnivore: Animal that feeds on both plants and animals.

Opening or Regeneration Timber Harvest: technique that removes all trees, regardless of size, on an area in one operation. Following the timber harvest, new seedlings will be planted in addition to the occurrence of natural regeneration.

Rendezvous sites: Temporary resting sites used for several days at a time by a wolf pack during summer months while pups are developing.

Riparian zone: Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics. Normally

used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

ROD: Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. Sometimes known as “The President’s Plan,” it is the guiding document for doing watershed analysis. Also referred to as the Northwest Forest Plan (NWFP).

Security habitat: Habitat that is outside of human influence zones.

Sensitive Species: (from <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy>)—For Region 6 of the Forest Service, those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density and habitat capability that would reduce a species’ existing distribution (FSM 2670.5).

Seral: Of or pertaining to the series of stages in the process of ecological succession.

Suitable habitat: Habitat in which an animal or plant can meet all or some of its life history requirements.

Survey and Manage species (S & M): Species to be protected through survey and management standards and guidelines on federal lands as identified by the Standards and Guidelines for Management of Habitat for Late-successional and Old-growth Forest and Related Species Within the Range of the Spotted Owl (ROD, Appendix J2).

Threatened species: A native species likely to become endangered within the foreseeable future.

Ungulate: For this analysis, includes elk, black-tailed deer, and mountain goat.

Vegetation Management: Treatment of forested stands associated with the Hansen project in this report includes thinning treatments and density management. These harvest activities are primarily proposed for commercial sale and additional sites designated for non-commercial treatment depending on the size of material to be removed.

5. Management Requirements and Mitigation Measures

The following Standards from the Forest Plan, as amended (2005, 2005a), apply to all alternatives:

Table 2. Terrestrial Wildlife Management Requirements and Mitigation Measures.

Wildlife

W1 –Trees greater than 20 inches DBH will not be cut. Any trees greater than 20 inches DBH that are required to be cut for safety will remain on site as coarse woody debris.	To maintain and retain late-successional conditions	HIGH Contract requirement	AMA plan implementation – exemption to REO letter	Timber sale contract and administrator, or their representative
W2 – Retain existing down woody debris and standing snags that are not deemed a hazard.	Maintain and enhance habitat diversity	MODERATE - LOW Availability within project stands.	Wildlife Forest-wide S&G (p. 4-124)	Timber sale contract and administrator, or their representative
W3 – If a raptor nest site is incidentally located during the course of sale layout or project implementation activities will stop and a Forest Service Wildlife Biologist will be consulted. At the Wildlife Biologist's discretion protective buffers and/or seasonal operation restrictions may be assigned to the newly located nest sites.	Minimize changes to microhabitat features adjacent existing nest sites & the protection of active nest site	HIGH Forest Experience	Migratory Bird Act Wildlife Forest-wide S&G (4-125)	Wildlife Biologist, Timber sale administrator, or their representative
W4 –Trees with interlocking branches with trees with suitable nest structure for owl and murrelet nest would be retained (visible suitable cavities or nest structure (platforms 4" at 30 ft.).	Maintain microhabitat conditions around potential nest trees	HIGH Forest Experience	ESA Section 7 consultation	Timber sale contract, layout and Timber sale administrator, or their representative
W5- Any tree \geq 21inch dbh located in adjacent old-growth habitat proposed as a tail tree or anchor will first be field reviewed by a Forest Wildlife Biologist or their representative to determine if the selected tree is a spotted owl or marbled murrelet potential nest tree (PNT). All tail trees will be retained as future wildlife trees.	Protect occupied nest trees of federally protected species (northern spotted owl and marbled murrelet)	HIGH Contract requirement	Wildlife Forest-wide S&G (4-124)	Timber sale contract and administrator, or their representative
W6-The thinning prescription would designate wildlife trees to retain that include dominant trees for future large snags, and marking of deformed green trees to retain for future wildlife trees. Snags would be created or protected through treatment of green trees with high stumping of hazard trees, and leaving green trees around snags of greater than 21 inches.	Snags and green trees would be designated for retention during sale layout to meet standards and guidelines for cavity nesters	HIGH Contract requirement	Wildlife Forest-wide S&G (4-124)	Timber sale contract and administrator, or their representative
W7- Dominant trees (> 20 inches dbh) infested with dwarf mistletoe will be retained in the thinning marking with thinning to occur within mistletoe stands to enhance light for growth.	Maintain and enhance murrelet nest structure and Hairstreak butterfly habitat	HIGH Contract requirement	Wildlife Forest-wide S&G (4-124)	Timber sale contract and lay out crew, TSA or their representative

W8 - Heavy equipment and other activities generating noise above ambient levels in historic owl or murrelet use areas, and occurring between April 1 and September 15 would occur between two hours after sunrise to two hours before sunset.	Reduce the potential disruption of marbled murrelet feedings or nesting.	Moderate 90% impacts reduction post-incubation stage; pre-incubation, the, mitigation would be ineffective	ESA Section 7 consultation	Timber sale contract and administrator, or their representative
W-9 – A seasonal operating restriction shall be applied to portions of non-commercial units U-187, U-236 and U-237 to protect mountain goat wintering habitat (MA 15) from Nov 15 to June 15.	Protect wintering mountain goats	HIGH Contract requirement	Wildlife Forest-side S&G	Timber sale administrator or their representative
W-10 – Slash pile burning would occur during the time period of August 31 to February 28, outside of the early nesting season. In the event that burning activities cannot be accomplished in this work window, the wildlife biologist will be advised and work with fire staff to meet approved conditions for fire control and smoke management.	Reduce the potential disruption of marbled murrelet feedings or nesting	HIGH Contract requirement	ESA Section 7 consultation	Timber sale contract and administrator, Forest fire staff and wildlife biologist

6. Analysis Methodology, Assumptions

The geographic scope of this report includes all federally owned lands and waters largely included in the South Fork Stillaguamish Vegetation Project area boundary as well as within the boundaries of the South Fork Stillaguamish drainage. The analysis area for direct effects to wildlife is the area of potential effects, including potential noise effects (chain saw and large equipment); the analysis of the indirect effects was primarily the area of the South Fork Stillaguamish drainage, except for the grizzly bear, which included a review of the adjacent Bear Management Units (BMUs), and the spotted owl and marbled murrelet which included assessment of the critical habitat areas, and snag and down wood which was assessed both on the project and landscape scale.

All project acres presented in this report are derived from GIS planning-level shapefiles involving information-based layers and associated attribute files. Slight discrepancies that may appear between reports are likely due to rounding errors.

The analysis approach focused on the existing major vegetation types, a review of species ecology literature, historical wildlife data on file, watershed analyses, review of Climate Change Vulnerability and Adaptation in the North Cascades Region (Raymond et al 2014), and personal knowledge of the project area. A concerted effort to conduct a comprehensive species inventory within the project area was considered impracticable for most species of concern due to expense and complexity of a species behavior and ecology.

Wildlife species and habitats indicated in Table 2 are subject of this analysis; they include: federal listed Threatened and Endangered Species (as administered under the Endangered Species Act); Regional Forester's Sensitive Species, Forest Management Indicator Species (MIS); Northwest Forest Plan Survey and Manage Species, Management Area habitat and species; and neotropical migratory birds, as potentially affected by proposed project activities.

The information used in this analysis was obtained from a variety of sources.

- Site visits for Project planning by district and forest wildlife biologist
- Site visits by FWS/FS regarding ESA habitat conservation in proposed project activities.
- Existing databases and inventories; typically stored electronically at the administrative offices and at other Federal or state natural heritage administrators.
- Consultations with other resource professionals.
- Relevant sources of scientific literature
- Personal knowledge of resources based on field visits and experience.

Survey and Manage pre-disturbance surveys were not conducted. The project area is outside the suspected range of the Larch Mountain Salamander and Van Dyke's salamander. Some areas of potential disturbance were below 1,500 feet elevation and would normally trigger pre-disturbance surveys for the mollusk, Puget Oregonian (*Cryptomastic devia*), but due to the lack old-growth features and the mollusk's obligate association with Bigleaf maple (*Quercus macrophyllum*) habitats surveys were deemed unnecessary for this species. Other species identified in the field were noted during general field visits without the use of systematic or regimented wildlife surveys or monitoring. Inferences to northern spotted owl presence in or adjacent the project area are derived from personal knowledge by Forest Service staff, historic data collected, and personal communications.

The following habitat types were identified in the project area and are discussed in this report.

- Mature/large-diameter conifer forest
- Managed second-growth dominant conifer forest
- Deciduous forest with scattered conifers
- Talus, boulder with scattered vegetation
- Grass/shrub with scattered conifer and deciduous trees
- Riparian (red alder and black cottonwood forest)

Northern spotted owl activity centers are generally described within a relative broad area on the landscape. This is a precaution to inhibit any unintentional or malicious intent to harm or harass federally protected wildlife species.

Consultation with the U.S. Fish and Wildlife Service will be facilitated for federally listed species. The grizzly bear, gray wolf, northern spotted owl and marbled murrelet are considered, with two of four listed species identified as the focal species for formal consultation. There is designated critical habitat for the northern spotted owl and marbled murrelet within the project area boundary.

7. Affected Environment

The management actions under consideration are being proposed includes the following components:

- Non-commercial thinning of densely stocked stands (walk-in, cut and leave downed trees)
- Commercial thinning of stands by removal of timber with the connected actions necessary for stand treatments.
- Road treatments (upgrades, storage, and decommissioning).
- Trail, trailhead and visual quality management.
- Aquatic organism passage improvements.

Vegetation treatments by thinning are expected to facilitate habitat improvements for a host of wildlife species as well as meeting the objective of the land use allocation, as specified in the NWFP. Another benefit is to help with fuels reduction in place of historic fire regimes in the area, and minimize insect outbreaks, and other forest pathogens. Stand replacing wildfires may adversely impact ecosystem functions resulting in slow recovery of habitat and wildlife species that are present in and adjacent the project area. Proposed treatments would occur in the following management allocations: Late-Successional Reserve, Riparian Reserves, and Mountain Goat Winter Range.

The project area is located in the SF Stillaguamish watershed in Snohomish County on the Darrington District, starting approximately 10 miles east of Granite Falls, WA. It is in the north-central part of the Western Washington Cascades Province. The project planning area encompasses approximately 65,000 acres of National Forest System lands outside of wilderness in the SF Stillaguamish River drainage and lies within a portion of the 110,108 acre Independence Late Successional Reserve (LSR) #116.

The South Fork Stillaguamish River watershed includes 8 fifth field subwatersheds: Middle South Fork Stillaguamish (30,156 acres), Canyon Creek (15,455 acres), and Upper South Fork Stillaguamish (25,154 acres), North and South Canyon Creek (24,672 acres) and Headwaters South Fork Stillaguamish (21,260 acres).

The second-growth stands within this area were regenerated after clearcut harvesting that occurred from the early 1940's through the 1980's into the early 1990's. There are also second growth stands on the slopes of Dickerman Mountain to Barlow Pass (upper drainage) that

regenerated after wildfires started from railroad traffic between Everett and mining community of Monte Cristo. None of these mature second-growth fire stands (> 80 years of age) are part of the proposed thinning treatments. The 2001 LSR assessment describes recommendations for vegetation treatment in the LSR to increase patch size and increase the development of old growth structural characteristics in early and mid-successional stands. Areas in the South Fork Stillaguamish drainage are recommended treatment areas (USDA 2001).

The Forest Service lands north of Interstate 90 up to British Columbia, Canada within the North Cascades mountain range are considered part of the North Cascades Grizzly Bear Recovery Area.

List of Species Considered

The following federally listed endangered and threatened, Forest Service Sensitive, Management Indicator Species (MIS) and other species are addressed in this document. These species are known to or are suspected to occur in the project area or was historically present (Table 2).

Table 2. Terrestrial Wildlife Species Considered for Project Area Analysis.

Species or Habitat	Status	Preferred Habitats	Occurrences in or Adjacent to Project Area ¹
Northern Spotted Owl (<i>Strix occidentalis caurina</i>)	Threatened/ MIS	Mature, old-growth forests (nesting, roosting, foraging); second-growth used for dispersal	Documented
Marbled Murrelet (<i>Brachyramphus marmoratus m.</i>)	Threatened	Mature, old-growth forests (nesting, roosting)	Documented
Grizzly Bear (<i>Ursus arctos horribilis</i>)	Threatened/ MIS	Core Security habitat with adequate forage and > 300 m from motorized roads and high-use trails	Suspected
Gray Wolf (<i>Canis lupus</i>)	Endangered/ MIS	Security habitat with reliable prey base and > 300 m from road and high-use trails	Suspected
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Sensitive/ MIS	Cliff habitat for nesting near adequate prey base	Suspected, but not documented
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Sensitive/ MIS	Roost, nest habitat and forage areas near lakes, reservoirs, rivers with readily available food source (fish and carrion)	Documented
Harlequin Duck (<i>Histrionicus histrionicus</i>)	Sensitive	Swift, moving streams (rivers and creeks), adequate pool habitat for foraging and brooding.	Documented
Common Loon (<i>Gavia immer</i>)	Sensitive	Large lakes	Suspected, but not documented
Northern Goshawk (<i>Accipiter gentilis</i>)	Sensitive	Mature or old forest habitat for nesting	Documented
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Sensitive	Abandoned mine shafts and other human-made structures for roosting and hibernacula; Foraging in forest edges	Documented, suspected
Mountain Goat (<i>Oreamnos americanus</i>)	Sensitive/ MIS	Habitat of cliffs, isolated rock outcrops, forest cover in winter	Documented

California wolverine (<i>Gulo gulo luscus</i>)	Sensitive	Large expanse of minimally disturbed habitats, persistent snow fields, & reliable prey base.	Documented Suspected
Giant Palouse Earthworm (<i>Driloleirus americanus</i>)	Sensitive	Native habitat consists of the bunch grass prairies of the Palouse region. The fertile soil consists of deposits of volcanic ash and rich layers of organic matter.	Not documented
Broadwhorl Tightcoil (<i>Pristiloma johnsoni</i>)	Sensitive	Includes abundant ground cover, conifer or hardwood overstory, and moderate to deep litter	Suspected, but not documented
Shiny Tightcoil (<i>Pristiloma wascoense</i>)	Sensitive	Ponderosa pine and Douglas-fir forests at moderate to high elevations	Suspected, but not documented
Western Bumblebee (<i>Bombus occidentalis</i>)	Sensitive	A generalist forager and has been reported to visit a wide variety of flowering plants	Suspected, but not documented
Johnson's Hairstreak (<i>Callophrys johnsoni</i>)	Sensitive	Old-growth coniferous forests; associated with conifer mistletoe (genus <i>Arceuthobium</i>)	Documented
Melissa Arctic (<i>Oeneis Melissa</i>)	Sensitive	Dry tundra, talus slopes, fellfields, rocky summits and saddles, ridges, and frost-heaved clear-cuts; generally occurs above the timberline, which, in Washington, is at about 7,000 to 8,000 ft.	Suspected, but not documented
Valley Silverspot (<i>Speyeria zerene bremnerii</i>)	Sensitive	Inhabits windy peaks with nearby forest openings. It is also found in native prairies and grasslands, often tending towards more mesic sites.	Suspected, but not documented
Little Brown Myotis (<i>Myotis lucifugus</i>)	Sensitive	Conifer and hardwood forests, but also occupies open forests, forest margins, and shrub-steppe clumps of trees in open habitats, cliffs and urban areas	Documented
Cascade Red Fox (<i>Vulpes vulpes cascadenensis</i>)	Sensitive	Inhabits the upper forest, subalpine parkland, and alpine areas of the Cascade Range. It is only found in Washington where it has been documented from 2,500 feet but primarily occurs above 4,500 feet.	Suspected, but not documented
Larch Mountain Salamander (<i>Plethodon larselli</i>)	Sensitive/ Survey and Manage	Associated with hardwood logs, leaf litter, and beneath cool and moist rocks and talus. Not suspected north of Highway 2.	Not Documented
Van Dyke's Salamander (<i>Plethodon vandykei</i>)	Sensitive/ Survey and Manage	Associated with hardwood logs, leaf litter, and beneath cool and moist rocks and talus. Not suspected north of Highway 2.	Not Documented
Puget Oregonian (<i>Cryptomastix devia</i>)	Survey and Manage	Mature to old growth conifers with bigleaf maples	Suspected, but not documented
Evening Fieldslug (<i>Deroceras hesperium</i>)	Survey and Manage	Perennially wet meadows in forested habitats	Suspected, but not documented
American Marten (<i>Martes americana</i>)	MIS	Old-Growth and Mature Forest for denning, resting	Documented
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	MIS	Old-Growth and Mature Forest	Documented
Primary Cavity Excavators	MIS	Availability of snags and downed Logs	Documented
Neotropical Migratory Birds	Species of Concern	Vegetation of all successional stages including diverse seral stages, water features and rock/cliff features.	Documented
Mountain Goat Winter Range (MA-15)	MR	Forested stands, steep rocky cliffs, projecting pinnacles, ledges, talus generally tree-line and below.	Documented

¹Documented – species is known/documented to occur in or adjacent (w/in 1 mile) of proposed project area.
Suspected, but not documented – species is known (documented) to occur within the Darrington Ranger District, but has not been documented within or adjacent the project area.
Not documented – species considered locally extirpated, or not documented on the Darrington Ranger District.

FEDERAL LISTED THREATENED AND ENDANGERED SPECIES

Northern Spotted Owl

Activity Centers: Within the project area there are eleven historic owl activity centers. The project area is also within the home range (1.9 mile radius) of six additional historic owl activity centers. All owl activity centers are based on historic surveys in the 1990s. Owl territories in or near the project area have not been recently surveyed to protocol.

Table 3. Owl Activity Centers In and Adjacent to South Fork Stillaguamish Vegetation Project Area

Territory Name	Last Known Status	Activity Center Location in Relation to Project Area	Proposed Veg Treatment within Home Range	Proposed Veg Treatment within Core
Canyon West	RS	In	N	N
Tupso	PR-R	Out	N	N
Spoon	PR-R	In	Y	Y
Seven	S	In	Y	Y
Green	PR	In	Y	Y
Turlo	RS	In	Y	Y
Wiley	S	Out	Y	Y
Pilchuck	S	In	Y	Y
Gordon	PR-R	In	Y	Y
Mallardy	RS	In	Y	Y
Boardman	RS	In	Y	Y
Upper Clear	PR	Out	Y	N
Deer	PR-R	In	Y	Y
Marble	PR	Out	N	N

Perry	PR-	In	Y	Y
Barlow	PR	Out	Y	N
Falls	PR	Out	N	N

Habitat: The spotted owl continues to display an apparent declining population trend across its range (as was predicted in the Northwest Forest Plan), particularly in Washington and British Columbia, Canada. However, a 5-year status review of the northern spotted owl recently completed by the U.S. Fish and Wildlife Service (USFWS) concluded that the species should remain listed as threatened under the Endangered Species Act, and not moved to endangered status. The main current threats for spotted owls on the MBS appear to be residual effects on habitat from past timber harvest and competition from barred owls (Courtney, et al. 2004).

The Sustainable Ecosystem Institute (SEI) report (Courtney, et al. 2004) identified the value of retaining large blocks of suitable nesting habitat for spotted owl recovery, and the threats of habitat loss (fire and timber harvest), and competition from barred owls. Results from regional monitoring studies (PNW-GTR-850) indicate a continued decline in the spotted owl population in the western cascade province for the last 15 years (Davis, R., et al. 2012). The downward trend is likely due to a combination of factors. Past timber harvest resulted in habitat reduction throughout the owls' range, although the trend of spotted owl reduction has also been seen in the National Parks where there was no loss of old growth habitat.

The South Fork Stillaguamish project area is within a large Late Successional Reserve (Independence LSR 116) which encompasses most of the South Fork Stillaguamish River drainage. This LSR, with 60-80% of functioning late successional old-growth forest (LOS), is considered Priority 2 for restoration in the forest-wide late successional reserve assessment (LSRA) (USDA 2001). Here, 'functioning' refers to the amount of LOS within the LSR. Under the LSRA, the objective is to restore LOS to 80% or more of the LSR area. This analysis looks at the need for restoring total area, along with the pattern and distribution of LOS both within the LSR and the South Fork Stillaguamish project area.

Spotted Owl Prey Base: Other factors contributing to owl declines may be a low prey base. The flying squirrel (*Glaucomys sabrina*) is a major prey item for spotted owls in the North Cascades, and is a species associated with old-growth forest features of snags, downed logs and multi-layer canopy structure (Wilson, 2010). Flying squirrels forage on fungal sporocarps and field studies have positively correlated higher densities of flying squirrels to biomass and frequency of food (Gomez and others (2005). The variable densities of flying squirrels on the landscape are attributed to both food resources and forest structure (Gomez and others 2005, and Holloway and others, 2012). Holloway and others (2012) argued that forestry practices negatively influence flying squirrel abundance with the decrease in snag density and suggested that cavities for denning are a limiting resource for flying squirrels. Studies by Manning (2012) found that heavily thinned second growth stands had lower densities of flying squirrels than control or old-

forest stands. Wilson (2010) suggested that protective cover for flying squirrels from predators such as owls and weasels may also be a limiting factor. There are no long-term studies to describe flying squirrel response to thinning beyond 10 to 12 years, but papers by Manning (2012), Holloway and others (2012), and Wilson (2010) report densities of flying squirrel are sensitive to thinning in young Douglas-fir stands for up to a decade following treatment. The management of the young forests provides trade-offs between providing short-term, ephemeral habitat in dense unthinned stands and thinning treatments to promote development of more complex habitat in the long-term (Manning, 2012). These papers suggest a conservative landscape management strategy of maintaining connected, dense, closed-canopy forests (unthinned stands) within managed or thinned forests. However, Sollmann et al. (2016) suggests that while thinning had negative effects on flying squirrel density on the scale of a thinning unit, their results indicate that those effects were largely absorbed by the heterogeneous landscape, as animals shifted their distribution into unthinned areas without a decline in overall density.

Barred Owl: Barred owls have been detected across the South Fork Stillaguamish drainage. Increased habitat competition with the barred owl is one of the factors attributed to spotted owl decline (USFWS 2011). The barred owl population was noted in the early 1980's on the Forest and has continued to increase in the Pacific Northwest (Hamer et al 2007, Hamer 1998). In comparison with the spotted owl, the barred owl is slightly larger, has a wider array of diet items, is more aggressive and has a higher reproductive rate. Barred owls select nesting habitat structure comparable to spotted owls, but are found widely in second growth (suspected foraging), in habitat that is not as fully utilized by spotted owls. There exists a range-wide trend that spotted owls will continue to be displaced by increasing barred owl numbers (USDI 2008, 2011 and USDI 2012).

Disturbance: The early nesting season for spotted owl occurs from March 1 – May 30. During this time, owls initiate nesting and incubate eggs. Adverse effects from noise disturbance during the early nesting season are of concern due to the potential to interrupt optimal nest selection, or incubation success. Since most owl activities are nocturnal, noise from daytime activities are less likely to disrupt owl feeding or nesting activities. Disturbance after July 15 is not expected to adversely affect spotted owl nesting because young birds will be capable of flight and can move out of an area where noise affects them.

The project area encompasses the western portion of the Independence LSR 116 and contains areas suitable for nesting by spotted owls. Because of its size and expected contribution to spotted owl production, this LSR is very important to the success of the LSR conservation strategy adopted by the Northwest Forest Plan (USDA Forest Service and USDI Bureau of Land Management 1994). The LSR is expected to be a source of owls dispersing to two neighboring LSRs.

The Final Revised Recovery Plan for the Northern Spotted Owl (USDI 2011) recommends retaining all occupied and unoccupied, high quality spotted owl habitat on all lands to the maximum extent possible. This plan does not include specific recommendations on a network of management areas for spotted owl habitat, since the USFWS is in the process of conducting a

range-wide, multi-step modeling process to design, assess, and inform designation of a habitat conservation network that will help address the recovery of the spotted owl.

Designated Northern Spotted Owl Critical Habitat

The project area contains part of the 438,255 acre, Critical Habitat Unit (CHU)#4, West Cascades North subunit 1 (WCN-1) for the northern spotted owl (USDI 2012).

This LSR is an island of national forest lands, and provides east-west and north-south distribution of spotted owl habitat in the Washington portion of the Western Washington Cascades Range Province. CHU#4 was established to provide nesting, roosting, foraging and dispersal for the recovery of the owl, which follows the objectives set aside for the LSR and the recovery plan for the spotted owl (USDI 2011). The final rule on critical habitat supports management of forest stands in CHUs to restore structure associated with spotted owl use.

“Some proposed Federal forest management activities may have short-term adverse effects and long-term beneficial effects on the physical or biological features of northern spotted owl critical habitat. The Revised Recovery Plan for the Northern Spotted Owl recommends that land managers actively manage portions of both moist and dry forests to improve stand conditions and forest resiliency, which should benefit the long-term recovery of the northern spotted owl (USDI 2011). For example, variable thinning in single-story, uniform forest stands to promote the development of multistory structure and nest trees may result in short-term adverse impacts to the habitat’s current capability to support owl dispersal and foraging, but have long-term benefits by creating higher quality habitat that will better support territorial pairs of northern spotted owls. Such activities would have less impact in areas where foraging and dispersal habitat is not limiting, and ideally can be conducted in a manner that minimizes short-term negative impacts” (USDI 2012).

Marbled Murrelet

The murrelet continues to display an apparent declining population trend across its range (as was predicted in the Northwest Forest Plan), particularly in Washington. In Zone 1, there is a declining trend of 7.4% of population/yr., or about 30% decline in population since monitoring began in 2001.

Numerous stressors have been identified that may be contributing to decline in population. Main stressors identified by the Recovery Implementation Team (USDI Fish and Wildlife Service 2011) are:

- Ongoing and historic loss of terrestrial (forest) nesting habitat
- Predation on murrelet eggs and chicks in their nests
- Changes in marine forage conditions, affecting the abundance, distribution and quality of murrelet prey
- Post-fledging mortality

- Cumulative and interactive effects of factors on individuals, populations, and the species

Surveys for murrelets are limited, with historic detections primarily in the 1990's. Marbled murrelet detections (fly-overs and vocalizations) have been made in the South Fork Stillaguamish drainage (Forest Service Files), as well as activity associated with murrelet occupancy of sites for nesting. The first nest site discovered in the state of Washington was in the Lake 22 drainage in 1991. . There are approximately 70 murrelet detections within the project area and approximately 12 detections adjacent to the project area (within 0.5 miles). Many of these detections occurred at survey points positioned on roads and landings and not in suitable nesting habitat. The project area ranges from approximately 18 to 36 miles from the salt water of Puget Sound.

On the Mt. Baker-Snoqualmie National Forest, murrelet activity associated with occupied murrelet sites has been most frequently recorded for sites within 40 miles of salt water. This is consistent with information in the critical habitat designation (<http://www.gpo.gov/fdsys/pkg/FR-2011-10-05/pdf/2011-25583.pdf>).

The second growth forests within the project area do not meet established definitions of suitable murrelet nesting habitat. "All records of nests, eggs, eggshell fragments and downy chicks in Washington have been associated with old-growth forests." (p. 145 to 55, General Technical Report PSW-GTR-152, 1995). There are adjacent stands within 0.5 mile of proposed units that have forest structure that would provide suitable murrelet nesting habitat and have historic detections of murrelets. Similar to the spotted owl, suitable murrelet habitat includes the conifer-dominated stands that generally are described as old growth with branch structure adequately developed to support nesting platforms. Nesting platforms (branches with flat surfaces greater than 4 inches at 33 feet height into the canopy) are capable of supporting a nesting adult and chick (Nelson et al 2002). Suitable murrelet habitat is described by USFWS (USDI 2016) as having at least one potential nest tree must be present in a stand of trees at least one acre of size, and the stand trees must be at least ½ the height of the site potential tree. In Washington, the murrelet nesting season, when eggs are incubated, extends from April 1 – September 23 (USDI 2012).

Daily flights between foraging areas and nest sites primarily occur during dawn and dusk hours, but may occur at during any daylight hour. During this season, it is a potential concern that adult birds could be flushed from nests due to a disturbance. It is possible that eggs could cool to the point that the embryo dies during the period that the adult is absent, or that predators could more easily detect nests, or have easier access to eggs, resulting in nest failure. After the chick has hatched, adult movements to feed the young are primarily in the early morning and evening hours, while the chick remains on the nest in a downy coat of cryptic camouflage.

There is suitable marbled murrelet nesting habitat within the project area.

Designated Marbled Murrelet Critical Habitat

The project area contains most of the 104,707 acre Designated Critical Habitat unit (WA-09-b) for marbled murrelet (USDI 2016). The primary constituent elements include: 1) individual trees with potential nesting platforms, and 2) forested areas within 0.8 kilometers (0.5 miles) of individual trees with potential nesting platforms, and with a canopy height of at least one-half the site-potential tree height. Designated Critical Habitat also includes habitat that is currently unsuitable, but has the capability of becoming suitable habitat within 25 years.

Grizzly Bear

The North Cascades area north of Interstate 90 is part of a recovery zone for grizzly bear as outlined in the Recovery Plan of 1993 and 1997 Supplement (USDI Fish and Wildlife 1993 and USDI Fish and Wildlife Service 1997b). In 1997 the North Cascades Grizzly Bear Management Committee, which consists of the Park Superintendent of the North Cascades National Park and the Forest Supervisors of the Wenatchee, Okanogan, and Mt. Baker-Snoqualmie National Forests, agreed to an interim standard of "No Net Loss" of core habitat until superseded by a Forest/Park Plan amendment or revision (USDA Forest Service and USDI Fish and Wildlife Service 1997).

Based on grizzly bear habitat use studies in Montana and British Columbia, core habitats were defined as those areas > 1/3 mile (500 m) from open roads, motorized or high use non-motorized trails. High use non-motorized trails are defined as trails with > 20 parties per week during bear seasons. The early bear season is defined as den emergence through early summer (March 15 through July 15) and the late season is defined as late summer to denning (July 16 through October 31). The baseline for the no net loss policy was based on mapped status of road and trail systems occurring in Bear Management Units (BMUs) as of July 31, 1997. Validation of road/trail status and use continues to be refined and updated with site specific project review.

The proposed activities occur in two grizzly BMUs. A status of 70 percent core habitat for interior BMUs and a status of 55 percent core habitat for exterior BMUs are considered desirable by the Interagency Grizzly Bear Committee (IGBC 2001). Both BMUs are considered exterior (USDA 1998). Based on the 1997 baseline analysis the Boulder BMU provides mostly moderate quality core habitat, while the Sisters BMU is currently below the desired amount of core habitat in both the early and late season (Table 3).

Table 3. 1997 Baseline of Percent Grizzly Core Habitat Within the Boulder and Pilchuck Bear Management Units.

BMU	Acres	% Federal Land	% Core Early Season	% Core Late Season
Boulder	168,202	81.1	56.0	53.0
Pilchuck	114,215	32.7	50.0	48.0

There are no recent Class 1 sightings (confirmed sightings) of grizzly on the Darrington District. The most recent Class 1 sighting occurred in 1996 over 16 miles east of the project area.

Gray Wolf

Wolves are not habitat specialists, but are dependent on a sizeable ungulate prey base. On the MBS, wolves would be largely dependent on deer as a food source. Elk and deer populations are currently low, compared to those that resulted from past large-scale timber harvest and the resulting early-seral habitat. The wolf prey population (deer and elk) is insufficient to support a resident reproductive wolf population, and the Forest has concluded that there is no indication of resident wolves west of the Cascade crest on the MBS (USDA Forest Service 2002). It is assumed that only transient or dispersing wolves might be expected to temporarily wander on to the MBS. In essence, the MBS is not considered suitable habitat for resident wolf pack territories.

Currently, there are no known den or rendezvous sites on the Darrington Ranger District or on the MBS. On the Forest, the most recent report of a wolf activity was a rendezvous site in 1990 near the Cascade crest in the North Fork Sauk watershed, well east of the project area. In recent years, 14 resident packs have been documented on the east side of the Cascade crest (WDFW 2015).

For this analysis wolf security habitat is considered the same as core habitat for the grizzly bear.

SENSITIVE SPECIES

Forest Service Sensitive Species have no federal status and are managed under a Regional program. The species listed below are on the Regional Forester's Sensitive Animal List for the Pacific Northwest Region, and are documented or suspected to occur on the MBS. The sections in this document addressing these species meets the requirements for Sensitive Species as described in FSM 2670.

American Peregrine Falcon

The peregrine falcon was delisted in August 1999 and is managed and administered under the Forest Service sensitive species program. Cliffs and rock outcrops in relatively open areas are generally selected for nest locations. The diversity of habitats available in the river basin including ponded wetlands and riverine habitat are features that increases prey species diversity that are attracted to such environments.

Bald Eagle

There is no historic indication that bald eagles have nested in the South Fork Stillaguamish drainage. While bald eagles have been observed in the winter along the South Fork Stillaguamish River, total numbers are small and are limited by lack of anadromous fish (USDA 1996). Within a winter season (November through March), bald eagles in the Pacific Northwest use a large foraging area that includes most rivers in the Puget Sound region, the Fraser River system in British Columbia, coastal areas in western Washington and British Columbia, and portions of interior British Columbia and Washington state (Watson and Pierce 2001). Wintering bald eagles frequently move between major rivers in western Washington, in response to fish runs and shifts

in fish distribution due to flood or high water. However, it is unlikely that winter use would be impacted by the timing of the proposed activities.

Harlequin Duck

The harlequin duck is a small diving sea duck that is known to nest on the Mt. Baker-Snoqualmie National Forest. The birds generally congregate in the Puget Sound area coastal waters during the winter periods. Nesting habitat is generally found within inland forests with large streams, rivers, or lakes for nesting. Nests are well-concealed and may be selected on rock ledges, tree cavities, and stumps. Brood sites such as debris jams and other loafing sites are important (Spahr et al. 1991). By winter adults and broods disperse to coastal and Puget Sound marine waters. This species is documented using parts of the South Fork Stillaguamish drainage.

Common Loon

The common loon is a rare breeder in Washington; it has highly selective biological requirements for nesting, loafing, and feeding. The species has been documented on freshwater lakes and ponds on the Mt. Baker-Snoqualmie National Forest during migration period. Lakes offering potential nesting habitat are likely avoided by loons if chronic human disturbance, development, and illegal shooting are prevalent (Richardson et al 2000). Loons require relatively deep lakes or other bodies of water of sufficient area to facilitate ingress and egress for flight and to forage, rest and nest. There are several shallow water surface areas in the project vicinity, but they do not offer sufficient prey or space for flight maneuverability. There are no known occurrences of this species in the project area and there are no large lakes in the area that could provide habitat for common loon.

Northern Goshawk

This species is typically found in mature, old-growth forests. Northern goshawks appear to prefer relatively dense forests with large trees, and relatively high canopy closures. This species is documented using parts of the South Fork Stillaguamish drainage.

Townsend's Big-eared Bat

This species typically requires caves, abandoned mines, or abandoned wooden bridges or buildings for roosting habitat, particularly for maternity colonies and winter hibernacula (Fellers and Pierson 2002). With the exception of bridges, these features are generally absent in or near the Project area. Foraging habitat is present, but use is unknown. Forest edges, early seral habitats, roads, and other similar open habitat conditions (Johnson and Cassidy 1997) may provide forage habitat (Fellers and Pierson 2002). Townsend's big-eared bats have been detected on the Mt Baker-Snoqualmie National Forest, but no current surveys have been conducted in proximity of the project area. Perkins (1988) sampled at least 19 sites for the Townsend's big-eared bat including mines, caves, and bridges but did not locate any roost sites.

Mountain Goat

Mountain goats also serve as a management indicator for habitat that includes cliff habitats at upper elevations where forest communities begin to transition from mid-elevation to upper elevations habitats where subalpine communities begin to persist. Mountain goats are slowly making a comeback throughout the Mt. Baker-Snoqualmie National Forest following a period of population decline possibly due to over-hunting and lack of recruitment from more remote areas (Rice and Gay 2010). The project area is known to include habitat frequented by mountain goats. In portions of the project area where cliffs and exposed rock outcrops occur mountain goats have been observed. Goats may also on a rare occasion traverse through forest cover and over roads for the purpose of translocations to suitable habitat areas.

Forest mountain goat habitat allocation areas (MA 15) (LRMP 1990) are located within the project area.

California Wolverine

Wolverines are not tied to any specific vegetative or geologic habitat features – they use a variety of habitats, including those altered by management activities and fire and can persist in areas with dispersed or developed summer or winter recreation activities. Forest Service management activities may impact individuals, but do not adversely impact wolverines at the population level.

Historic records of wolverine occurrence in North America suggests it is a rare species with limited distribution and density and confined to the most northern latitude of the continental United States, as well as, in Canada and Alaska. In Washington, most of the historical records originate from north central portion of the state (Aubrey et al. 2007). Wolverines are suspected to occupy a variety of remote habitats in Washington such as alpine and subalpine habitats. Habitat preferences are influenced by available food sources, predation risk, and relatively low disturbance from human activity (Krebs et al 2007). Seasonal elevation shifts in habitat selection (low elevations in winter, higher elevations in summer) are correlated to food availability. Avalanche chutes may be important year-round habitats for food items due to presence of carrion from winter-caused mortality and as summer habitat where potential prey such as marmots inhabit (Krebs et al, 2007). Female wolverines with young may be particularly sensitive to human disturbance associated with roads and winter recreation activities (Krebs et al 2007).

Wolverines are documented on the Darrington District. There is adequate cover and habitat available within the South Fork Stillaguamish drainage for wolverine.

Giant Palouse Earthworm

Native habitat consists of the bunch grass prairies of the Palouse region. The fertile soil consists of deposits of volcanic ash and rich layers of organic matter. This species is not expected to occur in the project area.

Broadwhorl Tightcoil

The range of this species is from southwestern British Columbia through the north Cascades in western Washington, and south to northwestern Oregon. It is reported from many widely separate locations, although relatively few sites have been recorded in any region. The species appears to be more or less coastal although it occasionally occurs at inland sites (e.g. the western slope of the Cascades) (USDI Bureau of Land Management and USDA Forest Service 2011). Sites are generally very moist, with coastal influence. Typical site descriptions include abundant ground cover (salal, oxalis, sword fern, and grasses), conifer or hardwood overstory, and moderate to deep litter. Despite surveys on the MBS since 1997, in apparently suitable habitat, the species has not been found. This species is not expected to occur in the project area.

Shiny Tightcoil

There is maybe potentially suitable habitat for this species in the immediate vicinity of the project area. However, this species is only known to occur east of the Cascade Mountains. A tentative identification of this species occurring on the Olympic Peninsula remains unconfirmed 14 years after its reporting. Because the species is only known to occur east of the Cascade Mountains, and has not been confirmed to occur west of the mountains, it is not likely to occur in the project area.

Western Bumblebee

Bombus occidentalis was historically broadly distributed across the west coast of North America from Alaska to central California, east through Alberta and western South Dakota, and south to Arizona and New Mexico (Williams et al. In Press). Unfortunately, since 1998 populations of this bumblebee have declined drastically throughout parts of its former range. In Alaska and east of the Cascades in the Canadian and U.S. Rocky Mountains, viable populations still exist. Populations of the western bumblebee in central California, Oregon, Washington, and southern British Columbia have mostly disappeared. Bumblebees will visit a range of different plant species and are important generalist pollinators of a wide variety of flowering plants and crops (Goulsen 2003a; Heinrich 2004). Although bumblebees do not depend on a single type of flower, some plants rely solely on bumblebees for pollination.

Johnson's Hairstreak

The reproductive stages of this butterfly are considered old-growth obligates. Old-growth trees infected with the dwarf mistletoe are host to the insect's reproductive cycle. Known locations haven been documented on the Darrington Ranger District of the MBS, but are suspected in old-growth stands throughout the forest. Mature and old-growth trees are found in the South Fork Stillaguamish drainage. To date, no surveys have been conducted for this species in the project area. Although the species is mainly associated with old-growth forests, they have been found in younger age-class conifers (Davis et al 2011). Based on recent modeling analysis the likelihood of finding hairstreaks in the watershed has a moderate probability of occurrence (Davis et al 2011).

Melissa Arctic

This species inhabits dry tundra, talus slopes, fellfields, rocky summits and saddles, ridges, and frost-heaved clear-cuts. Exposed ridges that are covered with alpine grasses are considered optimal habitat (Pyle 2002). It generally occurs above the timberline, which, in Washington, is at about 7,000 to 8,000 ft. or higher (Pyle 2002). Known Washington records are from elevations of 7,000 to 8,324 ft.

Valley Silverspot

This subspecies is historically known from southwestern British Columbia south to west-central Oregon. In British Columbia, it occurs on Vancouver Island and Salt Spring Island, although recent searches of these islands found only a few surviving populations (USDI Bureau of Land Management and USDA Forest Service 2011). In Washington this species occurs on the San Juan Islands, along the Washington Coast Range, and in the Puget Trough (USDI Bureau of Land Management and USDA Forest Service 2011). This species is not expected to occur in the project area.

Little Brown Bat

This species is a habitat generalist that uses a broad range of ecosystems. In Washington it occurs most commonly in both conifer and hardwood forests, but also occupies open forests, forest margins, and shrub-steppe clumps of trees in open habitats, cliffs and urban areas. Day roosting occurs in a variety of sites, including buildings and other structures, tree cavities and beneath bark, rock and crevices, and mines. Night roosting can include bridges and structures.

Cascade Red Fox

Cascade red fox is a high-elevation subspecies of red fox that inhabits the upper forest, subalpine parkland, and alpine areas of the Cascade Range. It is only found in Washington where it has been documented from 2,500 feet but primarily occurs above 4,500 feet. It depends on the availability of subalpine meadows, high elevation tree copses, and mountain hemlock and subalpine fir dominated forests where prey and protection is found. Timber extraction may have a negative, indirect impact on foxes, due to coyote movements, but no effects have been documented. There have been no detections in the South Fork Stillaguamish drainage.

Larch Mountain Salamander

The Larch Mountain salamander is not known to occur on the Darrington District. Currently, the northern extent of the range of this species is thought to be state Highway 2, approximately 10 miles south of the proposed project area.

Van Dyke's Salamander

The Van Dyke's salamander is not known to occur on the Forest. Currently, the northern extent of the range of this species is thought to be state Highway 2, approximately 10 miles south of the proposed project area.

MANAGEMENT INDICATOR SPECIES

Management indicator species (MIS) are animal species identified in the Mt Baker-Snoqualmie Nation Forest (MBS), Record of Decision (ROD) signed 1990, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS are set forth in the Forest LRMP which directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the forest scale, monitor populations and/or habitat trends of MIS, as identified in the LRMP. Viability assessments for MIS are included in the 2011 Forest MIS Assessment (USDA 2011).

The LRMP for the MBS, adopted in 1990, identified 8 MIS (Table 4). Species include the grizzly bear, gray wolf, bald eagle, peregrine falcon, northern spotted owl, marten, pileated woodpecker, and primary excavators. The reason each species was selected as a MIS species is described in the Environmental Impact Statement, Mt. Baker-Snoqualmie Forest Plan, 1990. The objective was to select species that would indicate possible effects of changing plant communities and associated seral habitats on each species. These species were selected for their association with plant communities or seral stages, which management activities are expected to affect.

Table 4. Mt. Baker-Snoqualmie National Forest, Forest Plan Management Indicator Species (USDA 1990).

Species	Preferred Habitats	Reason For Selection as MIS	Habitat Present in Analysis Area	Species Present or Suspected in Analysis Area
Bald Eagle	Roost, nest habitat and forage areas near lakes, reservoirs, rivers with readily available food source (fish and carrion)	Threatened and Endangered Species Habitat	Yes	Yes
American Peregrine Falcon	Cliff habitat for nesting	Threatened and Endangered Species Habitat	Yes	No
Gray Wolf	Security habitat > 300 m from road and high use trails	Threatened and Endangered Species Habitat	Yes	Yes
Grizzly Bear	Core habitat > 300 m from road and high use trails	Threatened and Endangered Species Habitat	Yes	Yes
Mountain goat	Rocky slopes ≥ 40 degrees adjacent to forage and cover	Big-game Winter Range	Yes	Yes

Northern Spotted Owl	Mature, old-growth forests (nesting, roosting, foraging). Second-growth used for dispersal	Old-Growth Forest	Yes	Yes
American Marten	Mature, old-growth forest >40% fir and canopy closure >50%	Old-Growth and Mature Forest	Yes	Yes
Pileated Woodpecker	Mature, old-growth forest	Old-Growth and Mature Forest	Yes	Yes
Primary Cavity Excavators	Snags and downed logs in forested habitats	Snags and Downed Logs	Yes	Yes

MIS: Threatened and Endangered Species Habitat

The grizzly bear, northern spotted owl, and gray wolf are discussed in the Threatened and Endangered Species section of this report. The bald eagle and peregrine falcon, both delisted from the ESA list, are addressed in the sensitive species section of this report.

MIS: Mountain Goat Habitat

The mountain goat is addressed in the sensitive species section of this report.

MIS: Old-growth Forest

American Marten

Several studies have indicated a strong correlation between marten populations and the availability of old-growth forest (Raphael and Jones 1997), with local extirpations in areas with less than 30-50% old-growth forest across the landscape (Marshall 1994). Both natal and maternal dens are found in stands generally characteristic of late successional forests with a large amount of down woody debris and snags (Raphael and Jones 1997). Coarse woody debris and a shrubby understory are also important structural components of foraging habitat. Although historic logging has fragmented late-successional habitats, marten populations continue to inhabit river basins on the Darrington District that are in similar conditions found in the project area (Raphael and Jones 1990).

Pileated Woodpecker

Pileated woodpeckers use large snags and defective live trees for nesting, roosting, and foraging. Downed logs in various stages of decay are also forage sources (Mellen et al. 1992). Evidence of pileated woodpecker activity has been observed in the project area.

MIS: Primary Cavity Excavators

Primary excavators represent the snag and downed log component for species such as the northern flicker, red-breasted sapsucker, and hairy woodpecker, three species that are known to occur in the project area. Nesting and foraging habitat include cavities in both snags and trees (with heartrot) or otherwise with dead heartwood. Foraging generally occurs in dead or dying trees as well as recently dead snags. Habitat requirements are slightly different for each species but the commonality for all is forest stand diversity through a range of successional stages from small openings to late-seral stands. Primary cavity nesters play a critical role in providing nest sites for various species of secondary cavity nesters.

The Forest Plan, as amended, requires that the Forest retain snags across the landscape at levels sufficient to support major west-side Cascade cavity nesting birds at 40 percent of potential population levels using guides from the Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington (Brown 1985). Since the 1990's, there has been additional information on cavity nesters habitat needs on a landscape scale and the development of the DecAID advisory tool for evaluating species uses of snags and down wood (Mellen, et al. 2012). DecAID is "the decayed wood advisor for managing snags, partially dead trees and down wood for biodiversity in forests of Washington and Oregon. DecAID is a computer-based summary of current knowledge and available data on snags and dead wood in the Pacific Northwest ecosystems that can help managers evaluate effects of forest conditions, both existing conditions and conditions resulting from proposed management activities on organisms that use snags and down wood. A more in-depth analysis of snag and down wood is found in Appendix B of the Wildlife Specialist Report.

SURVEY AND MANAGE SPECIES

The Larch Mountain and Van Dyke's salamanders are addressed in the sensitive species section of this report.

Puget Oregonian

The Puget Oregonian snail is found from southern Vancouver Island, B.C. south through the Puget Trough and western Cascade Range in Washington to the Oregon side of the Columbia River Gorge. This species may be found in low to mid elevation mature or old-growth forest habitat (<460m/1500ft. elevation), typically this snail's habitat consists of mature to late successional moist forest and riparian zones, springs, and seeps where canopy cover is generally high. Rocks and talus, which are cool and moist beneath, may also be used. The Puget Oregonian hides under logs, moss, leaf litter, and/or talus; often under, near, or on large (greater than 20 inches dbh) big-leaf maple (*Acer macrophyllum*) and vine maple (*Acer circinatum*). Despite years of survey on the MBS since 1997, in apparently suitable habitat, the species has not been found.

Evening Fieldslug

Associated with wet meadows in forested habitats in a variety of low vegetation, litter, debris; rocks may be used. This mollusk is suspected to be within 30m (98 ft.) of perennial wetlands,

springs, seeps, and riparian areas. There is potentially suitable habitat for this species in the immediate vicinity of most of the sites. Occupied range for this species is from Hood River to The Klamath River basin, Oregon. Despite years of survey on the MBS since 1997, in apparently suitable habitat, the species has not been detected on the Forest.

January 2001 Survey and Manage ROD and Standards and Guidelines - Protection Buffer Species

These Protection Buffer species includes the white-headed woodpecker, black-backed woodpecker, pygmy nuthatch, and flammulated owl. These species are not known to occur on the Mt. Baker-Snoqualmie National Forest.

Bat Roost Sites – The Northwest Forest Plan Standards and Guidelines call for protection of caves, and abandoned mines, wooden bridges and buildings that may be used as roost sites by bats, specifically fringed myotis, silver-haired bat, long-eared myotis, long-legged myotis, pallid bat, and Townsend’s big-eared bat. These roost site features may be located in or near the project area.

NEOTROPICAL MIGRATORY BIRD SPECIES

Under the National Forest Management Act (NFMA), the Forest Service is directed to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.” (P.L. 94-588, Sec 6(g)(3)(B)). In late 2008, a Memorandum of Understanding (MOU) between the USDA Forest Service and the USDI Fish and Wildlife Service to Promote the Conservation of Migratory Birds was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the US Fish and Wildlife Service, as well as, other federal, state, tribal, and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that migratory bird conservation is addressed when planning for land management activities.

The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat Conservation Plans for birds and the August 2012 PIF North American Landbird Conservation Plan (Altman and Alexander, 2012) all reference goals and objectives for integrating bird conservation into forest management and planning.

The Mt Baker-Snoqualmie National Forest has a limited analysis of available data on migratory and residential land birds. Over a ten-year period a MAPS (Mapping of Avian Productivity and Survival) monitoring effort was conducted on the Darrington Ranger District. A final report was not submitted on this analysis although the raw data is available for review.

MANAGEMENT AREA 15 (MA-15) MOUNTAIN GOAT WINTER RANGE

Forest Plan management areas allocated for mountain goat winter range (MA-15) occur in the project area. Vegetative practices applied shall be for the primary purpose of maintaining mountain goat winter range. The Mt. Baker-Snoqualmie National Forest has a timing restriction for projects in winter range from October 31 to June 15.

LOCAL SPECIES OF CONCERN

Deer and Elk

Elk provide recreational, aesthetic, spiritual, and subsistence values to residents of northwestern Washington. Elk are not known to currently reside in the South Fork Stillaguamish drainage. The availability of forage in the project area in the future is a concern. Elk prefer early seral habitat for foraging. Since the mid-1990s timber harvest has been extremely limited and most of the past harvest units have developed into closed canopy stands limiting forage growth.

Taber and Raedeke (1980) reported that winter mortality, legal harvest, and poaching were the primary causes of elk mortality. Poaching is the second leading cause of mortality to elk in Washington State (WDFW 2004). As one might expect, a high density of roads can have a negative impact on elk with increased disturbance from legal hunting and poaching (CEMG 1999).

Deer occur throughout the area and both species use a combination of habitats comprised of cover and forage areas that are not too fragmented by road systems.

8. Environmental Effects (includes Cumulative)

The affected area for direct and indirect effects on the above species is described in the Affected Environment section of the Wildlife Specialist Report, and in the Environmental Consequences section for those species within the project area or with habitat within the project area. The area of analysis for wildlife effects is the South Fork Stillaguamish watershed, unless otherwise identified for specific species.

Potential impacts to these resources include the direct impact of vegetation treatments, commercial thinning (timber harvest) and associated ground disturbing activities to support all aspects of time harvest from road maintenance, temporary road construction, the use of gas-powered machinery including hand tools, yarding equipment, and all motorized wheeled vehicles. Other indirect impacts include slash disposal, by burning and scattering, and incidental damage to residual vegetation. Other impacts may occur from road treatments, recreational site creation, and aquatic organism passage improvements. These impacts may be considered separately depending on the anticipated impact to each resource.

The wildlife analysis focuses on potential effects to six categories of wildlife species: Federally listed Threatened and Endangered Species (and associated designated critical habitat, administered under the Endangered Species Act), Forest Service Sensitive Species, Forest

Management Indicator Species (MIS), Northwest Forest Plan Survey and Manage Species, management prescription species, and migratory birds, as affected by proposed project activities.

Table 2 provides the list of threatened, endangered, and sensitive species; Management Indicator Species, species of concern, Survey and Manage species; and migratory birds considered in this analysis. The table also indicates each species' status on the Mt. Baker-Snoqualmie National Forest.

There would be no impact on the following species because review of available records, pre-project surveys did not detect these species, the area does not support habitat for these species, or the suitable habitat that is present near the project area would not be affected, directly or indirectly, by implementation of the proposed activities: bald eagle, peregrine falcon, common loon, giant Palouse earthworm, shiny tightcoil, western bumblebee, Melissa arctic, valley silverspot, Larch Mountain salamander, Van Dyke's salamander, Puget Oregonian, and evening field slug. These species will not be further discussed in this document.

Effects Common to All Alternatives

Effects on Terrestrial Wildlife Habitat

Vegetation Stand Treatment (commercial thinning)-Upland Habitats

Thinning treatments may impact a relatively small number of terrestrial wildlife that may use habitats (live deformed trees, snags, and downed wood) for nesting, denning, resting, and foraging. The impact would likely be minor since few stands lack large-diameter snags and coarse wood. The amount of dead and downed wood is not evenly distributed among treatment areas. There are no anticipated adverse effects expected to conifer forest stands that appear monotypic and lack vertical and horizontal tree structure. Even Douglas-fir trees that were greater than 18 inches Diameter at Breast height (dbh) typically appeared robust with relatively few incidences of cavities that would provide habitats for hawk-size birds and small to medium sized mammals. Some talus or residual rock debris that have interstitial spacing may be disturbed from machinery or dislodged during yarding of timber, or temporary road construction. The benefits of thinning will be realized in expected accelerated tree growth both horizontal and vertically. By reducing canopy cover in a stand there would be a temporal benefit to more ground cover growth adding towards over all habitat diversity.

Vegetation Stand Treatment (commercial thinning)-Riparian Habitats

Impacts to riparian habitats will likely be similar to impacts that occur in upland habitats. Buffer widths that have a minimum of 50 foot buffer distance may offset potential disturbance to habitats in close proximity to the splash zone of perennial streams; therefore anticipated impacts is expected to be similar to impacts found in upland habitat areas. There is an expectation that flora composition would increase with added sunlight and space for more plant growth and increasing habitat diversity and would continue to act as connectivity blocks for dispersing wildlife.

Trailhead Development (openings) – Upland Habitats

Approximately 4 acres of the proposed project area would be converted to openings for trailhead expansion, trailhead relocation and development of a rock source. These three areas are generally second growth forest or early seral stage and do not currently provide habitat for most species due to their dense tree stocking and lack of understory vegetation.

Non-commercial thinning

There are 4,800 to 5,700 acres proposed for non-commercial thinning. Such trees are relatively small diameter that lack commercial value. The gain in this treatment is to reduce competition among trees with a stand for the purpose of reducing competition for nutrients and growing space among trees. Cut trees would be left on site and scattered to maintain mobility of wildlife that may cross the unit. Leave material may also be used for sheltering over-wintering black bears and other wildlife species.

Road Use

There would be use of approximately 57 miles of open Forest System roads. Although the project would open or re-open on a temporary basis a number of unspecified or non-system road segments (12 miles) as well as use of road prisms from previously constructed temporary roads (16 miles) and 1.5 miles of new temporary road for a total of approximately 30 miles of temporary roads, there would be no net increase of permanent roads associated with this project. High road densities are often associated with a reduction of wildlife use. The Forest maintains its policy for a no net loss of grizzly bear core habitats. Core habitats are generally defined as areas of quality habitat used by grizzly bears that are a minimum of 300 meters from any road accessed by motorized vehicles and high-use trails (i.e. more than 20 individuals per trail, per week). There would not be a net increase of roads in areas that are designated as core habitat.

By casual observation it is noted that a residual population of deer still maintains a presence in the South Fork Stillaguamish drainage, which can be impacted by open roads. It can only be speculated if roads have reduced habitat effectiveness for spotted owls and marbled murrelets. A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.25 mile from a major logging road. The corroborating evidence, however, still suggests that the presence of barred owls is a major factor in the spotted owl decline in the Pacific Northwest.

Road Treatments

Road decommissioning typically resolves potential issues that may impact wildlife. They include reducing harassment or disturbance to wildlife, poaching, off-road travel, destruction of vegetation associated with dispersed camping, and minimizing intentional or accidental release of petroleum-based or other potential toxins into the soil and water. The decommissioning process would be a short-term activity on the site that was previously disturbed during logging

operations. In the long-term the source of potential harassment is removed and the soil and plant growth would eventually reclaim the road site.

They include reducing harassment or disturbance to wildlife, poaching, off-road travel, destruction of vegetation associated with dispersed camping, and minimizing intentional or accidental release of petroleum-based or other potential toxins into the soil and water. The decommissioning process would be a short-term activity on the site that was previously disturbed during logging operations. In the long-term the source of potential harassment is removed and the soil and plant growth would eventually reclaim the road site. As decommissioned roads grow in, there is the loss of the more open edge effect from the road corridor which can provide forage plant species for ungulates, bears, bees and butterflies (Figure 18, Figure 19; Draft Pollinator Friendly Best Management Practices for Federal Lands, USDA and USDI 2015 <https://www.nps.gov/subjects/pollinators/best-management-practices-for-federal-lands.htm>).

Road treatments may also include upgrades of the current open road system and aquatic organism passage improvements. These upgrades can improve conditions for amphibians and mollusk movement within stream drainages with blockages.

Figure 18. Dense roadside trees and overhanging canopy result in poor pollinator habitat.

Figure 19. Roadside management results in canopy openings for good pollinator habitat.

Burning

Brush disposal abates the slash created by the timber harvest. Typical activities associated with this program include fuel pull back from roads and pile burning to reduce slash would be used in all created openings when practicable to do so. Burning operations that use power equipment may harass any owls or murrelets that might be present in un-surveyed nesting habitats, through noise and smoke disturbance.

Connected Actions

The proposed action would include the following connected actions associated with the timber harvest described above.

- Treatment to remove, control, or reduce the proliferation of invasive plants
- Re-seed or propagate openings with non-invasive forage seed mixes and planting of soft-mast producing shrubs.
- Implement projects to create wildlife habitats such as installation of artificial nest structures, create snags and install or repair gates.
- Daylighting of hauling routes.

Threatened and Endangered Species

Formal Section 7 consultation on the South Fork Stillaguamish project was initiated with review of the USFS Biological Assessment (January 2017) by U.S. Fish and Wildlife Service staff. Informal discussion from field meetings and Level 1 meetings resulted in the following effects determinations. The proposed actions would result in “no effect” to gray wolf, a “may effect, likely to beneficially affect” to grizzly bear, and a “may effect, likely to adversely effect” for spotted owl and marbled murrelet due to noise disturbance during the breeding season. The proposed actions would have a “may effect, not likely to adversely effect” for spotted owl critical habitat and a “may effect, likely to adversely effect” to marbled murrelet critical habitat.

The USFWS assured the BLM and Forest Service that it is committed to working closely with them to evaluate and implement active management and ecological forestry concepts of the spotted owl recovery plan and newly released spotted owl critical habitat rule, incorporating them into vegetation management projects. Both USFWS documents recommend that land managers use the best science to maintain and restore forest health and resilience in the face of climate change and other challenges. USFWS staff accompanied the Forest Service on field trips in 2015 and 2016 to the South Fork Stillaguamish project area to become familiar with the proposed project and to specifically discuss potential effects from the proposed project on spotted owls, marbled murrelets and critical habitat for owls and murrelets.

The formal Biological Assessment is being prepared for consultation with USFWS.

Northern Spotted Owl and Critical Habitat

Alternative A - No Action

Habitat

Implementing the No Action Alternative would have no direct effects on spotted owl habitat. The indirect effect would be no change in current development trajectories of highly stocked forests of second growth forest. Nesting habitat would continue to be limited, with growth development on individual trees decreasing over time due to tree-to-tree competition. Large trees with nesting structure for spotted owl are not expected for another 100 to 200 years or more. The residual older forest in the landscape and adjacent areas would retain potential nesting structure.

Disturbance

Since no activities would occur under this alternative, there would be no noise generated above ambient levels. Therefore, harassment of spotted owls would not occur.

Critical Habitat

There would be no direct effects to current primary constituent elements of nesting, roosting, foraging, or dispersal habitat. The indirect effect would be no change in current development trajectories of highly stocked forests of second growth forest. Nesting habitat would continue to be limited, with growth development on individual trees decreasing over time due to tree-to-tree

competition. Large trees with nesting structure for spotted owl are not expected for another 100 to 200 years or more. The residual older forest in the landscape and adjacent areas would retain potential nesting structure.

Alternative B - Proposed Action

Habitat

No suitable spotted owl nesting, roosting, or foraging habitat would be degraded or removed. Therefore, suitable spotted owl habitat would remain at current levels for functional fitness thresholds for core area and home range habitat conditions. The thresholds are based on a concept that it is necessary for a core area to have > 50% suitable habitat, and a home range to have >40% suitable habitat to maintain spotted owl life history functions associated with any given site.

It is expected that 2,160 to 3,600 acres of spotted owl dispersal habitat would be commercially thinned. Habitat would retain the qualities and functions of dispersal habitat because post-thinning stands would have a mean dbh of 11 inches or greater and more than 40% canopy closure (Thomas et al. 1990).

Non-commercial thinning would not impact suitable spotted owl habitat.

Trailhead expansion, trailhead relocation, and rock source development would impact up to 4 acres of spotted owl dispersal habitat. However, removal of 4 acres of dispersal habitat at three sites is not expected to impact to the function of dispersal habitat in the project area or critical habitat unit. Landscapes that contain at least 50 percent forest cover that is either suitable habitat or dispersal habitat are considered capable of supporting successful spotted owl dispersal (Thomas et al 1990). The removal of up to 4 acres of dispersal habitat is not likely to substantially affect spotted owls in the action area because spotted owls regularly disperse through highly fragmented landscapes that are typical in western Washington and western Oregon (Forsman et al. 2002).

Prey Base

Papers by Manning (2012), Holloway and others (2012), and Wilson (2010) report densities of flying squirrel are sensitive to thinning in young Douglas-fir stands for up to a decade following treatment. The management of the young forests provides trade-offs between providing short-term, ephemeral habitat in dense unthinned stands and thinning treatments to promote development of more complex habitat in the long-term (Manning, 2012).

However, Sollmann et al. (2016) suggests that while thinning had negative effects on flying squirrels density on the scale of a thinning unit, their results indicate that those effects were largely absorbed by the heterogeneous landscape, as animals shifted their distribution into unthinned areas without a decline in overall density. Therefore, commercial thinning is not expected to have a large impact on flying squirrel densities in the project area.

Disturbance

Approximately 1,685 acres of suitable nesting, roosting, and foraging habitat occurs within 65 yards of areas with expected noise generating activities. This represents approximately 6 percent of the habitat in the project area. Any owls nesting in those areas would be subject to adverse effects from March 1 through July 15. Although up to 1,685 acres could be subject adverse effects from noise disturbance, some noise generating activity is likely to occur outside the early nesting season. No adverse effects are expected to occur outside the early nesting season.

As a result this alternative may affect, and is likely adversely affect the spotted owl due to noise disturbance during the nesting season.

Alternative B would not contribute to a negative trend in the viability of this management indicator species on the Forest.

Critical Habitat

There would be no effects to current primary constituent elements of nesting, roosting or foraging habitat. However, commercial thinning, trailhead expansion, trailhead relocation, and rock source development is expected to impact the primary constituent element of spotted owl dispersal habitat.

The thinning units (2,160 to 3,600 acres) would retain their ability to provide dispersal habitat and it is expected that these areas would develop into nesting, roosting, and forage habitat earlier than if left untreated.

Trailhead expansion, trailhead relocation, and rock source development would remove up to 4 acres of dispersal habitat in three areas. However, removal of 4 acres of dispersal habitat at three sites is not expected to impact to the function of dispersal habitat in the project area or critical habitat unit. Landscapes that contain at least 50 percent forest cover that is either suitable habitat or dispersal habitat are considered capable of supporting successful spotted owl dispersal (Thomas et al 1990). The removal of up to 4 acres of dispersal habitat is not likely to substantially affect spotted owls in the action area because spotted owls regularly disperse through highly fragmented landscapes that are typical in western Washington and western Oregon (Forsman et al 2002).

As a result, this alternative may affect, but is not likely to adversely affect spotted owl designated critical habitat.

Marbled Murrelet

Alternative A - No Action

Habitat

Implementing the No Action Alternative would have no direct effects on marbled murrelet habitat. The indirect effect would be no change in current development trajectories of highly stocked forests of second growth forest within critical habitat. Tight canopy closure in these stands has limited the development of the branching structure characterized as murrelet nesting habitat. Nesting habitat would continue to be limited, with growth development on individual

trees decreasing over time due to tree-to-tree competition. Large trees with branch structure for marbled murrelet nesting are not expected for another 100 to 200 years or more. The residual older forest in the landscape and adjacent areas would retain potential murrelet nesting platforms. It may even have additional use by murrelets as the second-growth stands mature in the next 50 to 100 years, contributing to canopy height adjacent to suitable murrelet habitat and canopy closure limiting potential corvid predation of nest sites within old forest.

Disturbance

Since no activities would occur under this alternative, there would be no noise generated above ambient levels. Therefore, harassment of nesting murrelets would not occur.

Critical Habitat

Assessment of effects to marble murrelet critical habitat used the primary constituent elements identified in designation of critical habitat for the marbled murrelet (USDI 2016). As stated, the primary constituent elements that support nesting, roosting, and other normal behaviors that are essential to the conservation of the marbled murrelet include: (1) individual trees with potential nesting platforms, and (2) forested areas within 0.8 kilometer (0.5 mile) of individual trees with potential nesting platforms, and with a canopy height of at least one-half the site-potential tree height. Designated Critical Habitat also includes habitat that is currently unsuitable, but has the capability of becoming suitable habitat within 25 years.

As stated above in the “Marbled Murrelet,” section, there would be no change in the current stand conditions of critical habitat for marbled murrelets of individual trees or forested areas within 0.5 mile of potential nest trees. The old growth stands would continue to provide nesting structure, while the second growth forests within the project area would not meet established definitions of suitable murrelet nesting habitat. There would be no change in unsuitable habitat within 25 years. The indirect effect to critical habitat would be no change in current development trajectories of highly stocked forests of second growth forest within critical habitat. Tight canopy closure in these stands has limited the development of the branching structure characterized as murrelet nesting habitat. Nesting habitat would continue to be limited, with growth development on individual trees decreasing over time due to tree-to-tree competition. Large trees with branch structure for marbled murrelet nesting would not be expected for another 100 to 200 years or more.

Alternative B - Proposed Action

Habitat

Commercial and non-commercial thinning would not occur in suitable murrelet nesting habitat. Trailhead expansion, trailhead relocation, and rock source development would not occur in suitable nesting habitat. Therefore there would be no effect to nesting habitat.

Disturbance

Approximately 2,667 acres of suitable nesting habitat occurs within 110 yards of areas with expected noise generating activities. This represents approximately 9 percent of the nesting habitat in the project area. Any murrelets nesting in those areas would be subject to adverse

effects from April 1 through September 23. Although up to 2,667 acres could be subject adverse effects from noise disturbance, some noise generating activity is likely to occur outside the nesting season.

As a result this alternative may affect, and is likely adversely affect the marbled murrelet due to noise disturbance during the nesting season.

Critical Habitat

There would be no effects to current nesting habitat. However, commercial thinning, trailhead expansion, trailhead relocation, and rock source development is expected to remove primary constituent elements of (PCE) of murrelet critical habitat. PCEs of murrelet critical habitat include: 1) individual trees with potential nesting platforms, and 2) forested areas within 0.8 kilometers (0.5 miles) of individual trees with potential nesting platforms, and with a canopy height of at least one-half the site-potential tree height.

No PCE-1 trees would be impacted by commercial thinning, trailhead expansion, trailhead relocation, and rock source development as this would occur in second growth stands that, in this project area, would not likely to support platforms particularly in trees less than 26 inches dbh. While trees larger than 20 inch dbh would not be cut, trees that may occur within thinning units that are adjacent to possible nest trees (PCE-1) would be retained. PCE-1 trees would not be heavily affected by removal of hazard trees because hazard trees are unlikely to be potential murrelet nest trees.

PCE-2 trees would be impacted by commercial thinning, trailhead expansion, trailhead relocation, and rock source development. The thinning units would retain their ability to provide microclimate and windthrow protection, and provide cover to any nesting murrelets. Removal of 4 acres of PCE-2 trees at three sites is also not expected to impact to the function of providing microclimate and windthrow protection to PCE-1 trees. Therefore, the effect of the proposed action would not change the function of PCE-2 at the areas scale nor measurably affect suitable nest trees (PCE-1).

Thinning the second growth stands within critical habitat would promote development of future nesting habitat. Thinning would result in a more open canopy area within habitat not suitable for nesting murrelets. As the treated stands mature and develop branching structure for nesting murrelets, canopy closure and in-growth in the gaps would reduce the potential for corvid use of the thinned areas. Therefore, the thinning impacts would be short-term impacts in unsuitable habitat within the critical habitat designation, with potential long-term beneficial effects of reduced stocking levels in the second growth. Reduced stocking levels of trees per acre would reduce within-stand competition, allowing development of growth on fewer residual trees. This would promote large diameter trees with more pronounced crowns and development of large, lateral branches for future nesting habitat (USDA Forest Service, 2001).

As a result, this alternative may affect, but is not likely to adversely affect marbled murrelet designated critical habitat.

Grizzly Bear

Alternative A - No Action

Alternative A would result in continuation of current conditions and trends. The moderate amount of core habitat within the Boulder and Pilchuck BMUs is reflective of both the non-Federal lands within the BMU and the high road densities on the State and private land surrounding these BMUs. Early and late season foraging habitat within core habitat is limited within the project area to where there are natural openings that provide a variety of forbs and vegetative material. Previous harvested areas on federal lands are primarily in the closed canopy stage of forest stand development and offer little forage.

There would be no change in current access, so there would be no change in core habitat areas. There would be no change in vegetation status, so there would be no change in forage within the area. Limited foraging opportunities in natural openings would remain for grizzly bear.

Alternative B - Proposed Action

Since the 1997 Baseline was established, there has been an increase in core habitat on federal land due to road decommissioning and closure in the Boulder and Pilchuck BMUs as displayed in Table 5. The roads proposed for treatment and put into storage or decommissioned would further reduce open roads in Alternative B, providing additional acres of early and late core habitat in the two BMUs being analyzed (Table 5). This alternative would provide for a status of at least 55 percent core habitat for both BMUs, which are considered desirable for exterior BMUs by the Interagency Grizzly Bear Committee (IGBC 2001).

Table 5. Change in Grizzly Core Habitat on federal land in BMUs by Alternative as a Result of Road Decommissioning and Closure.

BMU Name	1997 Baseline		Alternative A No Action/Current		Alternative B	
	Early Core <i>(acres)</i>	Late Core <i>(acres)</i>	Early Core <i>(acres)</i>	Late Core <i>(acres)</i>	Early Core <i>(acres)</i>	Late Core <i>(acres)</i>
Boulder	13,457	12,174	16,659	15,153	19,319	18,492
Pilchuck	12,618	11,913	15,183	13,582	15,183	14,388

Core habitat is to be considered transitory for closed (stored) roads that have the option to be reopened in the future as management needs change. However, this does not diminish their contribution to core habitat while they are closed.

There would be a short-term (1 to 2 seasons per road segment) increase in human access during road work within the project area. Impacts to wildlife could include a temporary displacement of use of the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible in comparison to the amount of core habitat gained with these actions.

As a result, adverse effects to grizzly bear are not expected to occur. This alternative may affect, and is likely to beneficially affect the grizzly bear by increasing core habitat.

Alternative B would not contribute to a negative trend in the viability of this management indicator species on the Forest.

Gray Wolf

Alternative A - No Action

Alternative 1 would result in continuation of current conditions and trends. No change in current access would occur, so no change would occur in security habitat. No change would occur in vegetation status, so no change would result in early seral vegetation or ungulate forage within the area. Limited forage for ungulates would also limit the associated prey availability for wolves.

Alternative B - Proposed Action

For this analysis wolf security habitat is considered identical to core habitat for the grizzly bear (Table 5). The roads treated and put into storage or decommissioned would reduce open roads in Alternative B and provide the additional acres of security habitat for gray wolf.

There would be a short-term (1 to 2 seasons per road segment) increase in human access during road work within the project area. Impacts to transient wolves could include a temporary displacement of use of the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible in comparison to the amount of security habitat gained with these actions.

Although, the proposed road closures and decommissioning would increase potential security habitat, they are not expected to result in an improved forage base for wolf prey. As a result, adverse effects to gray wolf are not expected to occur. This alternative may affect, and is likely to beneficially affect the gray wolf by increasing security habitat.

Alternative B would not contribute to a negative trend in the viability of this management indicator species on the Forest.

Sensitive Species

Harlequin Duck

Alternative A - No Action

Under the No Action Alternative, there would be no impact to harlequin duck associated with proposed activities. There would be no changes in habitat for the harlequin duck from the proposed activities. Harlequin duck within the project area would continue to be exposed to the existing levels of disturbance within the analysis area, which includes recreation associated with activities such as dispersed camping and hiking.

Alternative B - Proposed Action

There would be a short-term (1 to 2 seasons per road segment) increase in human access during project activities near riparian areas within the project area. Impacts to nesting ducks could

include a temporary displacement of use of the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible, and the amount of secure nesting habitat gained with road closures and decommissioning is considered beneficial.\

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Northern Goshawk

Alternative A - No Action

Under the No Action Alternative, there would be no impact the northern goshawk associated with proposed activities. There would be no changes in habitat for the goshawk from the proposed activities. Goshawk within the project area would continue to be exposed to the existing levels of disturbance within the analysis area, which includes recreation associated with activities such as dispersed camping and hiking.

Alternative B - Proposed Action

There would be a short-term (1 to 2 seasons per road segment) increase in human access during project activities near potential nest areas within the project area. Impacts to nesting goshawks could include a temporary displacement of use of the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible, and the amount of secure nesting habitat gained with road closures and decommissioning is considered beneficial.

Mitigation measures would be in place to avoid and minimize disturbance and destruction of known and potential nest trees.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Townsend's Big-Eared Bat

Alternative A - No Action

No recent documentation of Townsend's big-eared bats or recent surveys in the South Fork Stillaguamish area are known, but Townsend's big-eared bats have been detected on the Mt. Baker-Snoqualmie National Forest in roosts on the underside of bridges and in a barn. The No Action Alternative would have no change in the features providing maternal or day/night roosts. No changes in habitat conditions would occur to provide open habitat for foraging.

Alternative B - Proposed Action

No change would result in features providing maternal or day/night roosts. This alternative would thin second growth stands, reducing canopy cover, which would promote understory development in treated areas and variations in foraging conditions potentially favored by Townsend's big-eared bats. The alternative would thin stands within the outer Riparian Reserves that would provide diversity in shrub and canopy cover along with open space for foraging bats (Ober and Hayes 2008). These areas would provide limited short-term forage opportunities (15 to 20 years) until canopy closure. Potential roost areas would be maintained in old forests.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Little Brown Myotis Bat

Alternative A - No Action

Little brown myotis have been observed in the South Fork Stillaguamish area. The No Action Alternative would have no change in the features providing maternal or day/night roosts. No changes in habitat conditions would occur to provide open habitat for foraging.

Alternative B - Proposed Action

No change would result in features providing maternal or day/night roosts. This alternative would thin second growth stands, reducing canopy cover, which would promote understory development in treated areas and variations in foraging conditions potentially favored by bats. The alternative would thin stands within the outer Riparian Reserves that would provide diversity in shrub and canopy cover along with open space for foraging bats (Ober and Hayes 2008). These areas would provide limited short-term forage opportunities (15 to 20 years) until canopy closure. Potential roost areas would be maintained in old forests.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Cascade Red Fox

Alternative A - No Action

There are no known sightings of Cascade red fox in the South Fork Stillaguamish drainage. Although this species is often associated with upper elevation areas they could disperse or move through lower elevations. The No Action Alternative would make no change in the current stand conditions or road density. No changes in habitat conditions that would favor a prey base for the fox would occur, and there would be no changes to conditions that might limit safe passage of fox through the area.

Alternative B - Proposed Action

Under this alternative, there would be no impacts to habitat for the fox. There would be a short-term (1 to 2 seasons per road segment) increase in human access during project activities within the project area. Impacts to the fox could include a temporary displacement of use in the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible, and amount of secure habitat gained with road closures and decommissioning is considered beneficial.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Mountain Goat

Alternative A - No Action

No thinning would occur in the MA-15 areas, and there would be no impacts to mountain goat habitat. Indirect effects of the No Action Alternative would be the retention of the MA-15 within the project area with a high proportion of the forest stands in high stocking levels. There would be a delay in potential development of the stands into mature and old forest, that are beneficial as winter range, with a continued period of within stand competition.

Alternative B - Proposed Action

This alternative would help improve habitat conditions for the mountain goat with a slight increase in forage production until forest succession incrementally reduces forage species as late-successional habitats continue to develop. Winter range condition in MA-15 is expected to improve as thinning would accelerate stand development into mature and old forest.

Roads proposed for closure and decommissioning also may reduce disturbance from human encroachment and lessen the chances of illegal harvest of mountain goats. Implementing road reductions would help improve habitat quality for mountain goats and benefit other big game species while non-motorized travel would retain access in the Project area.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Alternative B would not contribute to a negative trend in the viability of this management indicator species on the Forest.

Wolverine

Alternative A - No Action

No recent documentation is known of wolverine in the South Fork Stillaguamish drainage, but wolverines have been documented as a far-ranging species, dispersing or moving through lower elevations. The No Action Alternative would make no change in the current stand conditions or road density. No changes in habitat conditions that would favor a prey base for wolverine would occur, and there would be no changes to conditions that might limit safe passage of wolverine through the area.

Alternative B - Proposed Action

Under this alternative, there would be no impacts to denning habitat for wolverine. There would be a short-term (1 to 2 seasons per road segment) increase in human access during project activities within the project area. Impacts to wolverine could include a temporary displacement of use in the area during the work, typically less than 1 season. However, this potential disturbance is expected to be negligible, and amount of secure habitat gained with road closures and decommissioning is considered beneficial.

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Johnson's Hairstreak

Alternative A - No Action

No changes would occur in mature and old growth forests that host the Hairstreak butterfly, or in second growth habitat conditions that would favor development of dwarf mistletoe.

Alternative B - Proposed Action

This alternative would maintain the mature and old-growth forests with dwarf mistletoe at middle to low elevations. Thinning second growth stands and reducing canopy cover would promote dwarf mistletoe development in treated areas. There would be retention of large diameter trees with dwarf mistletoe infestations, but thinning would occur within the stands where these dwarf mistletoe-infested trees are located. The thinning activity would provide a more open canopy for dwarf mistletoe growth and spread. The USDA Forest Disease Management Notes reports: "Spread is most rapid in multi-storied stands; spread in single storied stands averages 1-2 feet per year; spread is faster in open than dense stands; death of host results in death of dwarf mistletoe." (<http://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=stelprdb5286951>). Dwarf mistletoe needs light to be able to reproduce, and the thinning would create conditions to encourage dwarf mistletoe growth (Muir and Hennon 2007).

The proposed activities may impact individuals, but are not likely to create a trend towards federal listing.

Management Indicator Species

Bald eagle, peregrine falcon, grizzly bear, gray wolf, northern spotted owl, and mountain goat are discussed in the above sections on threatened, endangered, and sensitive species.

American Marten

Alternative A - No Action

The No Action Alternative would have no direct effects to marten or to its habitat. No changes in habitat conditions that would favor a prey base for marten would occur, and there would be no changes to conditions that might limit safe passage of marten through the area. Indirect effects of the No Action Alternative would be the retention of the landscape within the project area with a high proportion of the forest stands in high stocking levels. There would be no management towards larger diameter trees. There would be a delay in potential development of the stands, with continued period of within stand competition. The denser stocked stands would have limited increases in tree diameter and volume due to the effects of competition for limited growing space (USDA Forest Service 2001). Habitat would continue to be limited, with growth on individual trees limited by the tree-to-tree competition. Large trees with defect or large diameter snag suitable for marten would not be expected for another 100 years or more (D.R. Tysell and A.B. Carey 2000). Large snags may take even longer to develop, 100 to 200 years depending on mortality events (Van Pelt and Nadkarni 2004).

Alternative B - Proposed Action

This alternative would maintain the suitable old forest habitat currently identified as potential pine marten habitat. The timber harvest and road work activities would provide variety in the

habitat conditions for marten hunting in the thinned second growth forest, but would reduce forest canopy cover in the short-term (next 10 to 15 years).

Thinning of mixed western hemlock and Pacific Silver fir second growth stands would have canopy reduction and gaps persisting for up to 50 years. Thinned areas may provide additional habitat for mice and small prey, and would retain the down wood component for cover for subnivian (under-snow) hunting. In the long-term (50 plus years), stand treatment could benefit marten by promoting stand diversity and structure suitable for denning habitat (mature and older forest). As marten habitat is associated with the Pacific Silver Fir zone, and the majority of the project (80 percent) is within the western hemlock zone, the habitat changes with is not expected to affect marten populations. This alternative would benefit marten habitat in the long-term through future stand development of larger diameter trees.

Alternative B would not contribute to a negative trend in the viability of this management indicator species on the Forest.

Pileated Woodpecker and Primary Cavity Excavators

Alternative A - No Action

Background

The Forest Plan, as amended, requires that the Forest retain snags across the landscape at levels sufficient to support major west-side Cascade cavity nesting birds at 40 percent of potential population levels using guides from the Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington (Brown 1985). For this project, the area of pileated woodpecker and primary cavity excavator's effects is the project area and federal lands encompassed within the South Fork Stillaguamish River watershed. Since the 1990s, additional information has become available on cavity nesters' habitat needs on a landscape scale, and the DecAID advisory tool has been developed for evaluating species uses of snags and down wood (Mellen et al. 2012).

DecAID is "the decayed wood advisor for managing snags, partially dead trees and down wood for biodiversity in forests of Washington and Oregon" (Mellen et al. 2012). DecAID is a computer-based summary of current knowledge and available data on snags and dead wood in the Pacific Northwest ecosystems that can help managers evaluate effects of forest conditions, both existing conditions and conditions resulting from proposed management activities on organisms that use snags and down wood. A more in-depth analysis of snags and down wood is in the Wildlife Specialist Report in the Project Record.

Snags

No timber harvest would occur in the proposed commercial harvest units and snags would develop as the stands grow overtime. This alternative allows development in the stands to proceed with current forest stand stocking levels. Mortality in these stands is predicted with the vegetation simulation model to be approximately 150 trees per acre per decade for the next two

decades. Mortality in these stands with dense stocking levels would result from competition for growing space. Mortality of the less competitive trees would provide abundant small-diameter snags (<10-inch dbh), some medium sized snags (11- to 19-inch dbh), but few snags of 20 inches and greater in diameter. This snag development would provide foraging habitat for some birds, but nesting habitat for many of the primary cavity excavators would continue to be limited due to the current size class of the stand and the resulting snags created. Pileated woodpeckers would be expected to utilize adjoining older forest areas for roosting and nesting sites (40 to 60 inch diameter trees), but forage on stumps or within the second-growth stand.

As the stands mature, larger diameter snags would develop as dominate and co-dominate trees succumb to disease, insects or environmental conditions. Large diameter tree development would not be expected for the next 30 to 50 years, and few large diameter snags (>20 inches dbh) expected for the next 50 to 100 years. (USDA Forest Service 2001). The second-growth stands would contribute to meeting conditions described as snag densities levels in the 30 to 50 percent “tolerance level” as they progress over time through mid-seral to late seral stages. “Tolerance level” is the percentage of individual birds within a given population that will nest in forest stands characterized by a certain number and size range of snags (Mellen et.al. 2012). For example, a 30 percent tolerance level of wildlife use of a snag diameter (dbh) means that 30 percent of all individuals observed of some wildlife species (using one or more studies) uses snags less than or equal to some specific dbh and 70 percent use snags greater than that dbh.

Snag levels in the second growth stands, as modeled out to the year 2116, are projected to contribute to snag levels at the 50% tolerance level for species associated with snags greater than 10” dbh and 50% tolerance level for species associated with snags greater than 20” dbh for the Western Lowland/Conifer Hardwood Forests (WLCH_S) vegetation types. Snag levels in proposed second growth project stands would contribute to a landscape that would maintain at least the 80% tolerance level for species associated with snags greater than 10” dbh and also an 80% tolerance level for species associated with snags greater than 20” dbh for the Montane Mixed Conifer Forests (MMC) vegetation types.

Within the project stands, the projected snag level would provide adequate snags of appropriate size for primary cavity excavators such as nesting Downey woodpeckers, and the red-breasted sapsucker, which provide cavities for Douglas squirrel and flying squirrel. The larger diameter soft snags typically used by nesting Hairy woodpecker and Northern Flicker or hard large snags for Pileated Woodpecker are lacking and are projected to be at snag densities to meet a 50 percent tolerance level. Snag densities vary across the landscape with larger diameter snags used by pileated woodpeckers and other cavity excavators located in the older forest stands that make up approximately 65 percent of the project area. Therefore on a landscape scale, the proposed action would contribute to snag densities that are expected to meet snags levels at 50 to 80 percent tolerance levels for wildlife species that are associated with both snags greater than 10 inches dbh and snags greater than 20 inches dbh.

Table 7. Modeled Snag Densities in Proposed Stands in Year 2116 Relative to DecAID for Western Lowland/Conifer Hardwood Forests.

Stand Age 2016?	Snag Size	Expected Snags/Acre*	DecAID – WLCH_S	
			Snag Density Range	Tolerance Level
40-80	≥ 10” DBH	~ 16.5 Snags/Acre	10 - 18 Snags/Acre	50% Tolerance
40-80	≥ 20” DBH	~ 7.5 Snags/Acre	0.9 - 12 Snags/Acre	50% Tolerance

Table 8. Modeled Snag Densities in Proposed Stands in Year 2116 Relative to DecAID for Montane Mixed Conifer Forests.

Stand Age 2016?	Snag Size	Expected Snags/Acre*	DecAID – MMC	
			Snag Density Range	Tolerance Level
40-80	≥ 10” DBH	~ 30.0 Snags/Acre	25 - 46 Snags/Acre	80% Tolerance
40-80	≥ 20” DBH	~ 11.7 Snags/Acre	7.2 - 15 Snags/Acre	80% Tolerance

Coarse Woody Debris

Snags

The thinning in Alternative 2 would capture some of the future snag and down wood that would be created from competition mortality as understory and intermediate trees are shaded out, and become snags over the next 50-100 years. There would be a reduction in potential snag and down wood biomass from the removal of these co-dominant and smaller diameter trees (less than 12 inches dbh). In Alternative 2, small diameter snags would continue to be provided through the “skips” in treatment provided by buffers on streams, wetlands, the retention of current pockets of root rot and beetle killed trees which are not part of the stand treatments (e.g stand g59). Snag creation within these “skip” areas and the thinned areas would be supplemented by natural mortality from storms, disease, bear damage, insects, drought, competition, etc.

It is expected that following the thinning in Alternative 2, the residual trees would have less competition, and more of the stand biomass would be captured in fewer, larger diameter trees. The concentration of growth on fewer stems has the potential to result in larger snag, and the recruitment of another age class in the understory that would provide for future small diameter snags.

Snag levels in proposed thinning units, as modeled out to the year 2116, would be maintained at least the 30 percent tolerance level for snags greater than 10” dbh and 30 percent tolerance level for snags greater than 20” dbh in the Western Lowland Conifer Hardwood Forest (**Error! Reference source not found.**) and for less than 30 percent in the Montane Mixed Conifer

Forests. Alternative 2 would retain adequate snags for nesting Downey woodpeckers, and the Red-breasted sapsucker within the , but the larger diameter soft snags for nesting Hairy woodpecker, northern flicker, or hard large snags for pileated woodpecker within the thinned stands are modeled as having low recruitment numbers/acre. The modeled expected snags/acre would not provide adequate numbers to support above 40 percent of the target primary excavator in the projected 100 years,

Table 9. Modeled Snag Densities in Proposed Stands in Year 2116 Relative to DecAID for Western Lowland/Conifer Hardwood Forests.

Stand Age	Snag Size	Expected Snags/Acre*	DecAID – WLCH_S	
			Snag Density Range	Tolerance Level
40-80	≥ 10" DBH	~ 0.5 Snags/Acre	4 - 5 Snags/Acre	30% Tolerance
40-80	≥ 20" DBH	~ 1.3 Snags/Acre	0 - 7.6 Snags/Acre	30% Tolerance

Approximately 7% of the acres commercially thinned would be in the MMC vegetation type, reducing the amount of snags in the proposed harvest units. Snag levels in proposed thinning units, as modeled out to the year 2116, would be maintained at less than 30% tolerance levels for both size classes.

Table 10. Modeled Snag Densities in Proposed Stands in Year 2166 Relative to DecAID for Montane Mixed Conifer Forests.

Stand Age	Snag Size	Expected Snags/Acre*	DecAID – MMC	
			Snag Density Range	Tolerance Level
40-80	≥ 10" DBH	~ 1.0 Snags/Acre	10 - 12 Snags/Acre	<30% Tolerance
40-80	≥ 20" DBH	~ 0 Snags/Acre	2.8 - 4 Snags/Acre	<30% Tolerance

The 2160 to 3600 acres thinned in Alternative B represents less than 6 percent of the approximately 65,000 acre project area and is less than one percent of the approximately 116,000 acres in South Fork Stillaguamish drainage. Even within the small project area or within the landscape view, the proportion of thinned to unthinned areas is of such a limited portion of the landscape that there would be a diversity of tree age classes, and creation of snags in all age classes over time from the old forests and unthinned forests. Alternative B following thinning would contribute to a landscape that meets conditions of 30 to 50 percent tolerance level of snag densities for cavity-associated species as per the DecAID review advisory.

Much of the potential tree mortality (future snags) would be captured with the proposed thinning. Tree mortality is modeled to decrease to approximately 18 trees per acre compared to 150 trees

per acre without thinning treatment. This thinning would decrease the number of green trees and snags in the less than 10-inches diameter class, which is the most abundant snag class, and also reduce the green tree and snag moderate size class (11- to 19-inches dbh), as the thinning from below captures potential mortality, in that size class of trees.

This alternative concentrates activities in second-growth stands of 40 to 80 years of age, with retention of untreated riparian areas to meet variety in size of stand components. All alternatives retain adequate snags for nesting Downey woodpeckers, and the red-breasted sapsucker, but the larger diameter soft snags for nesting hairy woodpecker, northern flicker, or hard large snags for pileated woodpecker have not yet developed adequate numbers to support above 40 percent of the target primary excavators within the second growth stands. Desired snag levels are managed at both the site level and the 6th field watershed level with special emphasis on large diameter snag retention and creation due to the lack of this cohort in the second-growth stands.

Snag retention would contribute to meeting the 30 to 50 percent tolerance level of snag densities for all cavity nesting species within the thinned stands of the 6th field analysis area. The proposed action would retain portions of stands with snags and exhibiting diversity in habitat such as the stand g59 which has heavy root rot pockets. The treated stands would contribute to meeting conditions described for snag densities initially in the 30 percent to 50 percent tolerance level, as stand progress over time through mid-seral to late seral stages. As the thinned stands mature and dominate and co-dominate trees overshadow lesser trees, larger diameter snags would be created. Alternative 2 would require 30 to 100 years to develop trees in the larger diameter size classes and initiate recruitment of large diameter snags to levels to contribute to an 80 percent tolerance level for snag using species of greater than 20 inch dbh snags.

Due to the limited treatments in Alternative 2 (combined non-commercial and commercial thinning) proposed within the project area there would be less than 10-12 percent of the project area with the modeled levels of reduced snag densities. The 2500 to 3600 acres proposed for commercial thinning in Alternative 2 represent less than 6 percent of the approximately 65,000 acre project area and is less than one percent of the approximately 116,000 acres in South Fork Stillaguamish drainage. The reduced snag densities in the proposed thinned areas are overshadowed by the amount of old forest snag contributions on the landscape that would maintain snag levels at the 80 percent tolerance level for species associated with snags greater than 10" dbh and with snags greater than 20" dbh for both the Western Lowland Conifer Hardwood Forest (WLCH) and the Montane Mixed Conifer Forests (MMC) vegetation types.

Alternative 2 snag retention would contribute to the 50 to 80 percent tolerance level of snag density on the landscape (5th field watershed) scale as described in DecAID analysis advisor for species associated with snags and down wood (Mellen et al 2012). Alternative 2 would not contribute to a negative trend in the viability of snag associated management indicator species on the Forest.

Coarse Woody Debris

Downed wood was not systematically inventoried for this project, but was based on field observations and DecAID analysis with current knowledge and available data on dead wood in the Pacific Northwest ecosystems for both existing conditions and conditions resulting from proposed management activities. It is expected that coarse woody debris would not increase as much of the potential tree mortality (future snags and logs) would be captured with the proposed commercial thinning. Tree mortality is modeled to decrease to approximately 18 trees per acre compared to 150 trees per acre without thinning treatment. However, on the landscape, the levels of coarse woody debris, as modeled in DecAID, are expected to continue to provide adequate levels of coarse woody debris for pileated woodpecker and primary cavity excavators.

Alternative B would not contribute to a negative trend in the viability of these management indicator species on the Forest.

Neotropical Migratory Birds

Alternative A - No Action

In the No Action Alternative, no change would occur in the current stand structure in the project area. Avian species richness (number of species present and using the habitat) in the second growth is relatively low due to the high number of stems per acre and the lack of any understory vegetation within the stands. As forest stands mature, there would be shifts in the habitat for land birds. Wind throw, disease, and other agents are expected to affect the stands and provide small openings with development of understory vegetation, and shrubs. Landbirds would continue to utilize the conifer forests, with early seral species more abundant along edges and openings, and with few late seral species associated with cavities or old forest structure. Land bird utilization of the project area may be limited by structure of the forest, with limited natural openings and edges within the stand for foraging and understory shrubs for roosting and nest sites.

Alternative B - Proposed Action

In this alternative, the variable density thinning would provide a range of canopy closure, more light reaching the understory, and additional development of understory and shrub vegetation for foraging and nesting habitat. Young stand thinning would result in short-term (5-10 year) habitat improvements for early seral species, such as rufous hummingbird. For species associated with older forest seral stages, such as Vaux's swift, the thinning treatments would result in long-term habitat structure.

Silvicultural practices that bring about small gaps were reported to not negatively affect the abundances of most forest birds and often even enhance it (Forsman et al. 2010). Studies by McWethy et al. (2009) suggested that bird species abundance and associated species richness would be maximized through relatively more frequent disturbance in highly productive systems. The increase in stand structural heterogeneity would support a variety of small mammals and birds. Heterogeneity in forests stands is encouraged with different pathways within and between stands (Franklin 2003).

The thinning would support strategies recommended by the North American Bird Conservation Initiative, U.S. Committee, in its report on the state of the birds in relation to projected climate

change (North American Bird Conservation Initiative, 2010). The following strategies are listed as key steps for forest birds:

Short-term actions should focus on managing forests to increase resistance to change and promote resilience. Managers can help forests resist climate change by protecting forests with high ecological integrity such as National Forest roadless areas and by improving forest health and reducing undesirable (or extreme) effects of fires, insects, and diseases. We can increase the resilience of forests to accommodate gradual changes by emphasizing process rather than structure and composition, such as restoring natural fire regimes where possible, and restoring natural hydrology to maintain fragile riparian forests. “

Long-term management practices would enable forests to respond to change. Examples include forest management to assist tree species transitions and range shifts and connecting landscapes by protecting large forest blocks and creating corridors, especially along latitudinal and elevation gradients. (North American Bird Conservation Initiative, U.S. Committee, 2010)

Deer and Elk

Alternative A - No Action

The No Action Alternative would result in no change in the current cover or forage for large game. There would continue to be cover, but very limited forage for ungulates. With the Northwest Forest Plan emphasis on older forests for the MBS, there is little opportunity to meet desired forage goals outside of localized areas such as vegetation management projects.

Alternative B - Proposed Action

This alternative would continue to provide over half of the watershed with canopy cover adequate to provide hiding and thermal cover. Activities include thinning treatments in the second growth stands that would promote more understory forage. Thinning treatments would open up the canopy, with the retention of 50 to 60 percent canopy closure. This canopy closure would result in some understory forage development, and would provide more than the current closed canopy that offers little to no understory vegetation. More forage is expected to develop within the gaps of 1/4 to 1/2 acre openings over 3 to 10 percent of the treated areas. Thinned areas would be influenced by adjacent stand structure, with neighboring tree height and canopy reducing solar exposure of the openings.

Cumulative Effects

A cumulative effect is the effect on the environment that results from the incremental effect of the action (the proposed project), when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present, and reasonably foreseeable future actions, the effects may

be significant. They can occur when small, incremental amounts of habitat are lost over time through a variety of management activities across a landscape.

The cumulative effects area for the wildlife review encompasses the South Fork Stillaguamish drainage for a variety of species. However, large ranging species had larger areas assessed. Grizzly bear and gray wolf were assessed using bear management units and designated critical habitat units were reviewed for impacts to marbled murrelet and spotted owl.

Appendix C of this report provides a comprehensive list of reasonably past, present and foreseeable future actions considered that could spatially and/or temporally overlap with the South Fork Stillaguamish project cumulative effects area.

Under the Alternative B, the following projects (Table 10) were found to be reasonably past, present and foreseeable future actions that could spatially and/or temporally overlap with the South Fork Stillaguamish project cumulative effects area:

Table 10. Potential Cumulative Effects of the South Fork Stillaguamish Project when combined with the effects to wildlife of other past, present, and foreseeable projects.

Activity	Extent	Wildlife Effect	Overlap?		Cumulative Effect
			Time	Space	
Future Actions					
Gold Basin Sediment Reduction Project	Gold basin Riparian area	Noise disturbance to nesting spotted owls and murrelets	Y	Y	Yes, potential for very limited noise disturbance to nesting owls and murrelets. However, the suitable habitat is scattered and impacts are negligible. Well over 90% of suitable nesting habitat within the watersheds would not be disturbed during time of implementation.
ERFO Road repairs -	Roads 4065, 4052 and Mt. loop	Noise disturbance to nesting spotted owls and murrelets	Y	Y	Yes, potential for very limited noise disturbance to nesting owls and murrelets. However, the suitable habitat is scattered and impacts are negligible. Well over 90% of suitable nesting habitat within the watersheds would not be disturbed during time of implementation.
Mt. Loop Road maintenance	Road cleared, roadside brushed	Noise disturbance to nesting spotted owls and murrelets	Y	Y	Yes, potential for very limited noise disturbance to nesting owls and murrelets. However, the suitable habitat is scattered and impacts are negligible. Well over 90% of suitable nesting habitat within the watersheds would not be disturbed during time of implementation.

Secondary Road and Trail Maintenance	Secondary road brushed every 3 years, grade/blade 2 times per year. Rock pit maintenance, Trail maintenance –yearly.	Noise disturbance to nesting spotted owls and murrelets	Y	Y	Yes, potential for very limited noise disturbance to nesting owls and murrelets. However, the suitable habitat is scattered and impacts are negligible. Well over 90% of suitable nesting habitat within the watersheds would not be disturbed during time of implementation.

9. Forest Plan Consistency

All Alternatives would be consistent with the Forest Plan, as amended, for wildlife resources.

1990 Forest Plan, Live and Dead Trees

Mitigation measures would be in place to retain existing standing snags that are not deemed a hazard.

1990 Forest Plan, Large Dead and Down Logs

Mitigation measures would be in place to retain existing down woody material.

1990 Forest Plan, Raptor Nests

Mitigation measures would be in place to avoid and minimize disturbance and destruction of known and potential nest trees.

1990 Forest Plan, Unique Habitats

Unique habitats would be carefully evaluated on the ground during the planning process to insure their protection and/or proper management.

1990 Forest Plan, Diversity

Proposed actions would continue to provide a mix and distribution of successional stages that would support maintaining or enhancing diversity

1990 Forest Plan, Levels of Deer and Elk Habitat Capability

Openings (thinning with ¼ acre gap openings) would increase habitat diversity by stimulating growth of early successional plants such as herbs, forbs, and shrubs through canopy cover reduction. Existing hiding and thermal cover would be available in stands adjacent to the project area.

The current road density in this allocation would be reduced following completion of project through road decommissioning and closure. Temporary roads constructed for timber harvest would be closed following thinning activities.

1990 Forest Plan, Management Area 15 – Mountain Goat Habitat

Seasonal operating restriction would be imposed in project area that are located adjacent and within designated mountain goat habitat (MA-15).

1990 Forest Plan, Connectivity

Proposed actions would continue to provide areas that serve as connecting habitat or corridors for indicator species, native and desirable non-native animal species and communities are maintained. This would be achieved with retention of existing spotted owl dispersal habitat, old forest conditions and untreated portions of the Riparian Reserve.

1990 Forest Plan, Threatened and Endangered and Sensitive Species

A Biological Evaluation was completed as described in Forest Service Manual 2670 and would ensure that habitat for sensitive animals would be managed to ensure that management activities do not contribute to these species becoming threatened or endangered.

A biological assessment was completed as described in Forest Service Manual 2670 and submitted for consultation with the U.S. Fish and Wildlife Service.

1994 ROD, Late-Successional Reserves

All activities proposed for the project were deemed neutral or beneficial based on the following prescriptions: prescribed stand treatments by thinning would benefit the northern spotted owl and marbled murrelet, two Federal listed species (ROD C-12). The treatments are designed to accelerate horizontal and vertical tree growth to provide nesting, roosting, and foraging habitat for the owl and nesting habitat for the murrelet. Thinning would also facilitate flight paths through the stand to help species access existing old-growth previously blocked by unthinned second-growth forests. All temporary roads would be removed following treatment.

1994 ROD Riparian Reserves

All activities would meet Aquatic Conservation Strategy # 8 to maintain and restore species composition and structural diversity of plant communities in riparian areas. Both action alternatives would meet Aquatic Conservation Strategy # 9 to maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-associated species. The project would maintain aquatic conditions and ACS objectives by preserving and enhancing connective corridors for wildlife that are dependent on late-successional forests. The thinning would also provide western red cedar and other understory vegetation an opportunity to become a more dominant part species distribution within the riparian zone and across the landscape.

2001 ROD, Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines

At this time there are no known or suspected S&M wildlife species in the project area. No pre-disturbance surveys were required.

10. Public Comment Response

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12. Maps (Indexed) if not within report

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